

Small but mighty

Run a \$2.5B company with five IT staffers? You bet. 29

**Roller-coaster ride**

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Want to cut TCO? Sweat the details

► Users find no silver bullet, concept fails to catch on

By April Jacobs

A YEAR AFTER total cost of ownership first exploded onto the desktop scene, few users report making much headway in cutting costs. The main obstacle, according to users and analysts, is the complex and nitty-gritty nature of the process itself.

Despite stacks of reports pushing and dissecting the concept and scads of products that supposedly help corporate information technology shops reduce costs, there

is no Band-Aid or one-shot answer. The reality is that to reduce or even control IT costs requires at minimum good asset management, efficient delivery of services, appropriate organization and analysis of financials. And that requires getting really granular.

In a recent report, Boston-based Aberdeen Group, Inc., said its "most important finding is that the notion of a precisely calculated

TCO for desktops, servers or TCO, page 93



Nancy Parker: Federal Home doesn't expect to quantify returns on projects

SPECIAL REPORT

ERP: The Next Stage

Enterprise resource planning systems are big, costly, consultant-intensive and notoriously hard to finish on time and on budget. Nevertheless, corporate America is embracing ERP as a fundamental part of the business infrastructure — as essential as the motherboard in a PC.

Analysts say 70% of the Fortune 1,000 firms have, or will soon install, ERP systems. This week, Computerworld takes a comprehensive look at where this critical business technology is heading — and the opportunities for your career.

Report starts on page 55.

Vice President of IS John Walshe wants ERP to be a unifying force for his growing global firm, Manufacturers' Services

Some highlights:

■ **THE DEBATE:** Is ERP an overly rigid chunk of software? Or is it the closest thing to IT nirvana that we're likely to see? Two experts speak out. Page 62

■ **THE FUTURE:** Users are starting to view ERP as an outward-looking tool for improving customer service. Page 56

■ **THE WISH LIST:** There's a disconnect between what ERP vendors are pushing and what users are looking for. Page 66

■ **THE JOBS:** ERP affects a business so profoundly that companies are still willing to dish out salaries of up to \$200,000 for rare IT professionals. Page 71



On Sept. 3, Swissair's Andy Guenthard got the dreaded call: A plane was down.

His E-commerce team quickly rebuilt its Web site to provide updates about the crash. Their work informed the world, gave mourners a forum in which to grieve and earned the airline praise for its handling of the tragedy. See story, page 18.

Users: Microsoft no bully

► Feds might argue it strong-armed users

By Stewart Deck

DID MICROSOFT CORP.'S alleged strong-arm tactics extend to the user community? The government last week appeared ready to make that argument, but in a random poll of 18 users, no one told Computerworld that they had been pressured by Microsoft or knew anyone who had.

"Absurd!" That's how Sam Cox, chief information officer at Brother Industries Ltd.'s U.S. operations in Bartlett, Tenn., labeled the Justice Department's

latest gambit. "I've never been pressured by Microsoft, and I think the whole investigation is a waste of taxpayers' money," Cox said. "They should use the money they're spending on this to do something good for society."

ANTITRUST CASE

"I never heard of Microsoft pressuring us or any other company to not buy other vendors' software — and we buy software from all different vendors, Microsoft included," said Stephen Brown, vice president of product engineering at Fleet Bank in Hartford, Conn.

"I've never had any problems [with Microsoft]," echoed Timmo Users, page 92

Consultants' travel costs draw IT ire

By Julia King

NOTHING IRKS Andy Hafer more than watching one of his out-of-town IT consultants sail out of the company parking lot behind the wheel of a cushy Lincoln Town Car.

The reason: "I know darn well that car-rental expense is going to come back at me," said Hafer, chief information officer at Hydro Agri North America, Inc. in Tampa, Fla.

"I'm sick and tired of paying ridiculous consultant travel Consultants', page 16

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Career Counselor Lina Fafard has tips on how to job-hop — safely. **IT Careers, page 73**

Web site aims to create order in a chaotic market for fish. **Internet Commerce, page 33**

Supply-chain apps are no magic bullet, says Pepsi's Pete Venegas. **Software, page 45**

EXECUTIVE Briefing

News summary for senior managers

■ Within hours after Swissair flight 111 went down, the company's Web crew redid the site with information to help relatives of the victims. Webmasters added bandwidth to support a flood of hits, responded to E-mail from victims' families, and posted regular news updates. Crisis managers call the measures — which include an online condolence book visitors can sign — a model of how technology can help companies respond to a disaster. **Page 18**

■ IT people skilled in any of the major enterprise resource planning (ERP) packages can demand up to \$200,000 per year. But in many firms, there's no career path beyond completion of an ERP project, so many bone up on business skills to stay flexible and productive. Others look to consultancies for jobs with high salaries and, sometimes, benefits. Ultimate success depends on following your strengths. **Page 71**

■ Buying fish is harder than you thought. Restaurants and retailers often have to call dozens of sources to get the kinds they want. A food industry credit reporting company named Seafax is trying to make that easier with a World Wide Web site to put buyers and sellers together, and planning to do a whale of a business. **Page 33**

■ Stock options fueled much of the rise of the tech industry, but with Wall Street snapping up and down like a yo-yo, how long can it go on, Dan Gillmor asks. Workers who've taken salaries over stock now don't have to feel like chumps, and the chaos may make it easier for corporate recruiters to compete with start-ups. **Page 26**

■ Most people use ERP applications for basic operations, but some use them to tie in to the

systems of new acquisitions, improve decision-making and automate supply chains. Now users want ERP vendors to do more integration work, make it easier to automate nonstandard processes and improve customer service. **Page 56**

■ Secure Internet chat software turns out to be a pretty useful tool for futures traders, who can blast quick warnings out to a list of clients when the market turns sour. It's much faster than faxes, offers easy two-way communication and, with the AbbottChat package at least, decent security. **Page 33**

■ First Union bank in Charlotte, N.C., is working on a way to let commercial customers transfer funds over the Internet. It doesn't think it can make much money on the project, but it hopes to attract and retain lucrative customers with the flexibility of the service. Still, many Internet banking projects have turned out to be less profitable than expected. **Page 8**

■ There's no defense against a Mark McGwire dinger, but Major League Baseball used technology to help prevent a melee of fans scrambling for No. 62. It tracked his previous homers and distributed security to the places the homers were most likely to land. **Page 14**

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Online this week

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SAP influence rockets as sales boom

► ERP vendor could collide with Microsoft

By Craig Stedman

R/3 USERS are starting to see a lot of Microsoft Corp. in SAP AG.

The German vendor is approaching Microsoft-like clout at the corporate level as sales of its enterprise resource planning (ERP) applications keep mushrooming and more users buy in to its attempt to position R/3 as a full-fledged business backbone around which other software has to revolve.

And despite that aggressive product development bent, other software makers are rushing to bask in SAP's aura by tying their applications to R/3 (see story at right). A horde of 260 technology vendors and consulting companies have anted up for booths at SAP's Sapphire '98 user conference, which is expected to draw about 15,000 people to Los Angeles this week. Of course, SAP isn't nearly as universally entrenched as Microsoft is at this point. R/3 out-

the head of a fast-growing number of corporate computing tables "sets up the potential for an SAP/Microsoft battle" for enterprise-level dominance, said Jim Shepherd, an AMR analyst.

For example, analysts said SAP, which just a year ago was playing up its support for Windows NT and Microsoft's SQL Server database, has now adopted a more ecumenical approach to underlying technologies such as operating systems.

And as SAP tries to establish R/3 as a backbone in its own right, "I think that makes Microsoft a little nervous," said Jim Holincheck, an analyst at Giga Information Group in Cambridge, Mass. The two companies "have drifted apart a bit," he added. "They're not out there shoulder to shoulder now."

At some SAP shops, business operations already revolve around R/3 far more than Microsoft's operating systems and other products.

"R/3 really is at the center of what we do," said Mike Panesis, director of management information systems at Church & Dwight Co. in Princeton, N.J. The maker of Arm & Hammer baking soda began running its corporate applications on R/3 in April, and Panesis said the SAP software now affects all technology decisions.

On the other hand, Church & Dwight thus far has avoided Windows NT servers and Microsoft's BackOffice software.

"Whenever someone has this much power, it can be abused," Panesis said. "But frankly, I

thought SAP would be worse than they have been. They were much more willing to listen to us and to work with third-party vendors than we expected."

Brother Industries Ltd., a Japanese maker of printers, typewriters, sewing machines and other products, uses Microsoft's desktop products. "But I see SAP as my backbone and Microsoft as a window into that backbone," said Sam Cox, chief information officer at Brother's U.S. operations in Bartlett, Tenn.

When R/3 couldn't handle Brother's product pricing formulas, the company decided to change them to fit the software, Cox said. And the more applications SAP develops, the better, he added.

To avoid integration hassles, Cox said he wants to look at tying third-party products to R/3 only "as a very last resort."

ENTHUSIASTIC BACKING

Farmland Industries, Inc., a \$9.1 billion farmer-owned cooperative in Kansas City, Mo., also has bought in to SAP's backbone pitch and plans "to incorporate as much of our business under R/3 as possible," said Dick Weaver, technology manager for Farmland's petroleum and crop production units.

A similar strategy is in place at Lucent Technologies, Inc.'s power supply unit, which plans to switch finance, production planning and its other back-office applications to R/3 this fall.

But Lucent needs to hook six third-party or custom applica-

Double trouble

SAP's two-pronged development strategy — open interfaces to R/3 on the one hand, aggressive expansion into new applications on the other — comes right out of the Microsoft playbook.

"It's akin to Microsoft's approach," said Heinz Roggenkemper, vice president of development at SAP's U.S. software lab in Palo Alto, Calif. Third-party vendors "know they have to run fast to keep an edge," he added.

SAP's strategy "is very much like what Microsoft is doing, and it isn't about being universally liked at all," said Jim Shepherd, an analyst at AMR Research.

Even SAP's vows of openness are "somewhat self-serving" because many of the application programming interfaces released by the company over the past two years were written to help tie its own added applications to R/3, Shepherd said.

"Obviously, SAP has learned a lot from Microsoft," said Tom Gormley, an analyst at Forrester Research, Inc. in Cambridge, Mass. And users now often mention the two companies in the same breath, he added.

— Craig Stedman



STEVE COATES

Farmland's Dick Weaver says his company plans to "incorporate as much of our business under R/3 as possible"

For example, industry analysts said, SAP has been able to freeze buying decisions for applications such as supply-chain management software by announcing plans to expand its reach into those markets.

sells its closest rivals almost threefold, but that still is expected to give SAP only 32% of the enterprise applications market this year, according to AMR Research, Inc. in Boston.

Nonetheless, R/3's place at

tions to R/3, "and which party line you get [from SAP on openness] depends on who you talk to," said Karen Peterson, manager of business process planning at the Lucent unit in Mesquite, Texas.

SAP's growing clout "does sort of worry you, just in the same way that Microsoft scares people," she added. □

Oracle to support Linux platform

► Endorsement aids push toward legitimization

By Stewart Deck

ORACLE CORP.'s announcement last week that it will port versions of its database and applications to the Linux platform could give the open-source Unix operating system another nudge toward enterprise acceptability.

Although acknowledging that Linux is a dependable operating system, many analysts and users have said the lack of formal technical support has kept

most large organizations from considering Linux as an alternative operating system for mission-critical applications [CW, Aug. 31].

"There are IS managers who won't even consider Linux because it is not backed by a known name," wrote analyst Bill Peterson in an International Data Corp. (IDC) report. Framingham, Mass.-based IDC is a sister company to Computerworld.

Although Oracle won't pro-

vide technical support for Linux, it will work with Linux vendors — including Red Hat Software, Inc. in Research Triangle Park, N.C.; SuSE, Inc. in Oakland, Calif.; Mountain View, Calif.-based VA Research, Inc.; and Tokyo-based Pacific HiTech, Inc. — on marketing and technology issues.

POSSIBLE STANDARD

Arvind Jain, a senior product manager at Oracle, acknowledged that it would take time to change public perception about Linux but said that "by offering

Lack of formal technical support has kept most large organizations from considering Linux.

our database and our applications [on Linux], we will promote further adoption of it as a viable platform."

Oracle CEO Larry Ellison said it is possible that Linux will become the standard Unix for PC-based systems.

Paul McNamera, vice president of strategic relationships at Red Hat Software, said that sort

of Linux endorsement from a large applications vendor is critical to corporate decision-makers.

"They're looking for signals that indicate that this really is a prime-time operating system," he said.

Jack Tackett, a manager of systems operations at Nortel, Inc., said Oracle's move should "help push the doors open for legitimate use [of Linux] in more organizations."

The Nortel Information Network runs Oracle applications on Windows NT, but "we're anxiously waiting to get the Oracle for Linux beta to see how it will fit in with our current systems," he said. □

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Microsoft, Compaq seek enterprise NT

► Reliability, scalability technologies on tap, but no delivery dates set

By Jaikumar Vijayan

COMPAQ COMPUTER CORP. and Microsoft Corp. last week unveiled an ambitious joint development plan to make Windows NT a safer place to run large corporate applications.

But users will have to wait a long time before any of the new features become available. Officials said most of the capabilities won't be ready until well after the arrival of Windows NT 5.0 — which still doesn't have a definite shipping date.

Officials at the two companies said they plan to integrate several Compaq-owned technologies, developed by subsidiaries: Digital Equipment Corp. and Tandem Computers,

Inc., into future versions of NT.

The joint initiative includes technologies such as Tandem's NonStop Kernel, as well as clustering and management capabilities from Digital's OpenVMS and Unix technologies.

ALREADY IN PROGRESS

The idea is to build a more scalable and reliable version of NT using core capabilities from those enterprise-hardened operating environments, spokesmen for both companies said. It isn't a new effort: Vendors such as Digital, Hewlett-Packard Co. and Tandem have been trying to integrate bits and pieces of their high-end server technologies into their Windows NT server platforms over the past two years.

But in this latest chapter, Compaq and Microsoft gave no details on when an NT version featuring the Digital and Tan-

BUILDING MORE INTO NT

Companies: Compaq and Microsoft

What technologies are being integrated: Clustered transactional and recovery services, remote mirroring, clustered file system, data and file partitioning, and remote system management

dem technologies will become available.

"The biggest question is,

when is all this new functionality going to get here? The need for it is right now," said James Garden, an analyst at Technology Business Research, Inc. in Hampton, N.H.

"If what they are touting is available now, it would be nice," said Eric Dickstein, a lead technical analyst at Continental Grain Corp., a \$14 billion agriculture firm in New York. Dickstein said he expects it could take years for the Microsoft/Compaq effort to bear fruit, however.

"The whole universe can change in that time," Dickstein said.

Rob Young, a consultant at Data Systems, Inc., said borrowing from technologies such as OpenVMS and Unix will make NT more robust. "I don't know

what Compaq gets out of this ... but it looks like they are helping Microsoft fix NT Server," said Young, who works at Du Pont Science Computing Division in Wilmington, Del.

UNIX TIES

Compaq and Microsoft also announced plans to build a range of interoperability tools and technologies that will allow users to better integrate their Windows NT and Digital Unix environments.

The latest move will build on the AllConnect Unix/NT integration program Digital had in place as part of a broad technology alliance with Microsoft.

So far, AllConnect integration tools and services have been offered as an option to Digital Unix users. Under the new initiative, both Microsoft and Compaq will work on building the hooks directly into future versions of Digital Unix. □

Digital Nervous System shows promise, but users wary

By David Orenstein

LAS VEGAS

WITH REAL-WORLD PROBLEMS to solve and diverse systems to operate, users at Microsoft Corp.'s first Business Applications Conference last week said it will be a while before they can adopt the company's Digital Nervous System application integration concept.

DIGITAL NERVOUS SYSTEM

What It Is: Microsoft's label for the idea of integrating enterprise applications and data to ensure that employees have access to key information.

Pro: A useful framework for thinking about information sharing and application architecture.

Con: The idea is sprawling and abstract, making it daunting and potentially costly to implement on a grand scale.

Microsoft's goal at the conference was to convince users that it is a company with a cohesive story for addressing overall strategic needs and doesn't just have a set of tactical tools, said Paul Gross, vice president of the tools division. The thrust of that pitch is the Digital Nervous System, which is Microsoft's version of the common idea that companies should integrate electronic-commerce, messaging, decision-support and other applications to make key news and data available to whoever can act on the information.

"In an ideal world, it would be great if all your applications were integrated," said Chris

Hooker, a financial programmer/analyst at Countrywide Home Loans, Inc. in Calabasas, Calif. "The problem is going to be in implementing it."

The concept is a useful framework, Hooker acknowledged, but his need is much more pragmatic: The current complicated nightly batch transfer that ports data from AS/400s to a SQL Server so that re-

problem is crucial for Fairbank, who eventually would like to pursue a few Digital Nervous System-like projects, such as building an intranet and enabling salespeople at conferences to place orders for the company's insurance, tax and law publications remotely.

ORGANIZATIONAL LIMITS

Other users said they have organizational rather than technical hurdles to leap before they can realize the goals of Digital Nervous System or even wider adoption of Microsoft tools.

Kenneth Folkman, a program analyst at Hill Air Force Base in Clearfield, Utah, said with so much closely guarded legacy and Oracle data at Hill, the adoption of a more Microsoft-oriented framework of widespread data sharing isn't likely to happen soon. Folkman's unit, which is responsible for repairing planes and missiles, uses custom Windows applications to control costs and automate procurement.

Pamela Young, manager of financial and administrative systems at New Jersey Transit, said the technical issues holding back the public bus and train system's procurement messaging system are simple. What she sought at the conference was help making the business case for the needed changes.

"In my mind, in my heart, I can feel and I can touch exactly what is needed — but more is needed. I have to be elo-

quent," Young said.

Kevin Wolf, a member of the professional services team at sales force automation vendor CWC, Inc. in Mankato, Minn., said that until more large corporate customers begin to buy Microsoft's enterprise story, all the

eloquence in the world won't help him sell Windows NT-based systems. Users with heavy investments in Unix have demanded that the company also produce its product with Java front ends built with Sun Microsystems, Inc. tools. □

Toyota forklift dealers go online

Until this year, Toyota Industrial Equipment's 170 forklift dealers nationwide faced delays that could cost them sales anytime they had to use the antiquated system connecting them with Toyota's home office in Torrance, Calif.

Each dealership had only one DOS-based dial-up terminal to check for parts availability and order status. Queries would be batched by the 13-year-old system and sent to Toyota, where the responses would be batched and sent back over the same slow system to the dealer, said Alan Cseresznyak, national manager of the administration support group.

A dealer able to constantly monitor the terminal could find out whether a part was in stock within five minutes. But a parts clerk without direct access might take a full day to get an answer for a customer. In the meantime, the customer would often make calls to competing forklift dealers, jeopardizing Toyota's chance to win the sale.

But since April, Toyota has been weaning its dealers off that system in favor of an application developed by Microsoft Corp.'s Consulting Service. It is based entirely on one Windows NT server in Torrance that interfaces with a legacy IBM IMS mainframe on the back end. Dealers can access the system from any computer with Internet access; the only client software needed is a World Wide Web browser. Now responses to queries come in seconds, Cseresznyak said.

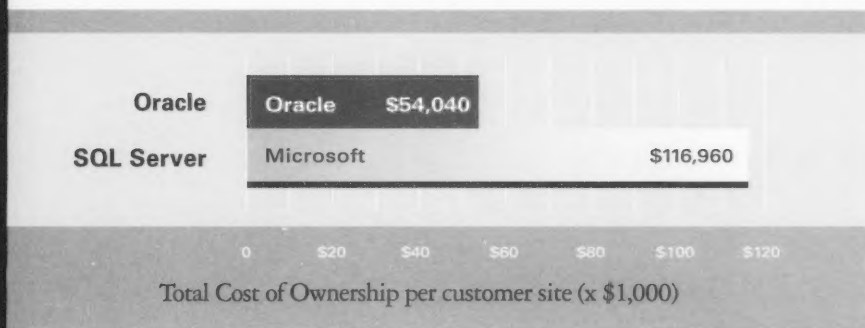
"Thirteen years ago, we did less than a tenth of the transactions we do today," Cseresznyak said. "If we didn't do this, we'd be at a competitive disadvantage."

Microsoft President Steve Ballmer cited this case study at the company's first Business Applications Conference last week. Microsoft is using the conference to advertise its new emphasis on providing services rather than platforms and tools.

—David Orenstein

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Bank seeks 'net gain

► First Union site will cater to corporate clients

By Thomas Hoffman

FIRST UNION CORP. has announced plans to become one of the first banks to offer corporate customers the ability to transfer funds over a secure Internet site.

Although First Union's WebAchieve service isn't expected to help the Charlotte, N.C.-based bank generate significant revenue in the short term, analysts said it should provide the bank long-term strategic advantage in retaining and attracting lucrative corporate clients.

Many companies still following the re-engineering mantra of the early '90s are streamlining their internal processes and examining how much it costs to cut a check to a business partner. A Fortune 500 manufacturer that spends \$10 to \$15 each time it sends a paper check to one of its suppliers can cut its administrative costs by 30% to 50% — adding up to thousands of dollars — by processing those payments electronically, said Rajeev Agarwal, an analyst at The Tower Group, a Newton, Mass.-based financial services consultancy.

Agarwal expects commercial bank customers to initially conduct electronic funds transfers for transactions of less than

\$5,000. For larger transactions, most companies will either wire the funds directly to a business partner or write a check when same-day payment isn't necessary, thus letting companies "gain some float," or interest on those funds, until the check has been cleared, Agarwal said.

WebAchieve (The "Ach" part stands for "automated clearing-house") is part of a \$70 million effort over the next two years to develop electronic cash management services. Other banks that have introduced World Wide Web-based funds transfer include First Maryland Bancorp in Baltimore and Chase Manhattan Corp. in New York.

To date, few Internet banking projects have delivered significant payoffs [CW, Aug. 31]. A report released last week by New York-based Ernst & Young LLP, said only 1% of more than 100 financial institutions surveyed ranked selling more products or services as their most important electronic-commerce goal (see chart).

Although First Union hopes to reduce the costs of distributing and installing the PC software it has offered customers for the past 10 years to conduct electronic funds transfers, there is a financial trade-off with the Internet-based service. First

(EMPTY)-COMMERCE

Most financial institutions don't have a business strategy for electronic commerce and Internet use

■ 70% don't have a pricing strategy for E-commerce

■ 14% ranked gaining new customers as an integral objective of their E-commerce

■ 1% ranked selling more products or services as their most important E-commerce goal

Base: Survey of more than 100 financial institutions, including banks, brokerages and insurance companies, across 26 countries, including the U.S., Europe, Latin America and Asia

Source: "Seventh Annual Report on Technology in Banking and Financial Services," Ernst & Young LLP, New York; Manpower, Cambridge, Mass.

Union (www.firstunion.com) is setting up WebAchieve on a separate set of servers behind its firewall for security purposes. "We're spending a lot of money on that," said Leslie Graham, vice president and automated clearinghouse product manager at First Union. She declined to disclose those costs.

Still, First Union is viewing WebAchieve as "a long-term investment," Graham said. She added that the bank expects to begin testing the service with fewer than 50 customers in the next few months before launching WebAchieve at year's end. □

Users seek tools to tie plants to back office

By Craig Stedman

PROCESS MANUFACTURERS in the throes of installing back-office applications such as SAP R/3 are starting to look at another daunting task: tying the business software to the devices that run their plants.

For companies such as Dow Corning Corp., shuttling data among process control systems and corporate applications is critical to everything from plant maintenance to production scheduling and to guaranteeing product deliveries to customers.

But standardized interfaces are in their infancy, and users who don't want to build their own links are being forced to manually enter shop-floor data into their applications.

"Our manufacturing scheduling people now spend about 40% of their time just moving data around [manually] and not scheduling," said Charles Lacey, chief information officer at Dow Corning in Midland, Mich. The \$2.6 billion maker of silicone and other materials is about two-thirds of the way through a global rollout of SAP AG's R/3 applications. A pair of R/3 interfaces developed by process control vendors are being piloted at Dow Corning,

but Lacey said it still isn't clear whether the automated links can get the job done.

For one thing, the company's 30 plants harbor a mix of different process control systems, said Lacey, who spoke in Boston last week at a manufacturing and automation conference put on by AMR Research, Inc. Winnowing down the "humongous amount of data" captured by Dow Corning's shop-floor devices is also a devilish task, Lacey added. "You have to pick and choose what you pass up the chain because you can kill your business system with data it just doesn't need."



Dow Corning's Charles Lacey: "You can kill your business system with data it just doesn't need"

Vendors aren't ignoring the problem. SAP has built a process-oriented data interface into R/3. Makers of process control systems, such as The Foxboro Co. in Foxboro, Mass., also are seeking a fix.

But hardly any process manufacturers have gone beyond the test stage with automated interfaces, said Bill Swanton, an analyst at Boston-based AMR.

Minerals Technology, Inc., a New York-based company that mines and processes limestone, began to use Marcam Solutions, Inc.'s applications at one of its plants late last month. Getting flow-rate measurements and other process data into the software is a must, said Keith Hanchett, information technology director at the company.

But Marcam, in Newton, Mass., doesn't offer any standard interfaces yet, and Hanchett said writing a custom link is too big of a project at this point.

For now, workers at Minerals Technology will have to manually enter shop-floor statistics into a spreadsheet-based "electronic clipboard," Hanchett said. □

Senate: Transportation in Y2K trouble

By Patrick Thibodeau
WASHINGTON

THE U.S. SENATE has discovered what many companies already know about year 2000 readiness surveys: They often end up in the trash bin.

That's what the Special Senate Committee on the Year 2000 found out last week in its attempt to measure the millennium bug's potential impact on the nation's transportation industries. Despite more than 100 follow-up phone calls by congressional staffers to 32 of the largest transportation companies, only 16 firms responded to the survey.

But the survey results were enough to alarm the committee chairman, Sen. Bob Bennett (R-Utah), who warned of "significant interruptions" in planes, trains, transit authorities and shipping services as a result of

the year 2000 computer glitch.

Only a third of the companies responding to the survey have completed year 2000 assessments — "a task that should

only conclude that those who didn't respond are either unaware of the severity of the problem or are embarrassed over their lack of progress," he said.

Several chief information officers from the transportation industry appeared at the hearing voluntarily to testify about their year 2000 projects. They generally reported poor response rates to questionnaires they sent to suppliers and vendors, because of litigation fears. "I think it's a little scary that people are not responding," even when the Senate is doing the asking, said Charles Feld, CIO at Delta Air Lines, Inc. in Atlanta.

But the Senate is doing better



"I think it's a little scary that people are not responding."

— CHARLES FELD, DELTA

have been finished over a year ago," Bennett said. Moreover, only half of the firms had begun contingency planning to keep operating in the event of year 2000 problems.

Bennett clearly wasn't pleased with the lack of cooperation with the Senate survey. "I can

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Novell deal delivers Microsoft browser

By Laura DiDio

SOME MIGHT CALL it sleeping with the enemy, but to Novell, Inc. and some of its users, it is just good business sense.

That's how Chris Stone, senior vice president of strategy and corporate de-

velopment at Novell, characterized the Provo, Utah-based company's agreement last week to license and distribute all current versions of rival Microsoft Corp.'s Internet Explorer World Wide Web browser with Novell products.

"There's a 90% overlap in Novell's

and Microsoft's respective customer bases. This type of inclusive functionality is something our customers wanted — choices," Stone said. "It's an indication that we can work with Microsoft." Stone was referring to the fact that Novell also will continue to bundle Netscape Com-

munications Corp.'s Navigator and Communicator into NetWare.

Four users contacted by *Computerworld* said Novell's decision to bundle Internet Explorer in with NetWare, Novell Directory Services and Zenworks doesn't impact them from a practical standpoint because they already have Internet Explorer 4.0 installed. Rather, the users said, they are most cheered about the significance of the announcement.

"It sounds like the boys are getting to feel good about each other and bury the hatchet someplace other than in each other's backs. It is good business sense. Novell and Microsoft can't keep waging war like they have been, since it's only the users that get hurt," said Matt Rice, vice president and senior network



USTrust's Matt Rice: Microsoft and Novell might be ready to "bury the hatchet someplace other than in each other's backs."

manager at USTrust Bank in Cambridge, Mass.

Rodolphe Jabbour, integration and test lab manager at GMAC Corp. in Detroit, agreed. He said he hopes the pact signifies a warming trend in the formerly frigid relations between Novell and Microsoft "that will extend to other products as well."

"We have both Novell and Microsoft on our servers and desktops," Jabbour said. "The rivalry has made life tough on us. There's been lots of finger-pointing when problems arose. And we've had to avoid having our full-time Microsoft and Novell on-site consultants present at the same staff meetings because we could feel the heat."

The deal calls for Microsoft's Internet Explorer to be made available to all NetWare customers as part of a regularly updated client CD-ROM. Additionally, the Microsoft Web browser will ship with future versions of Novell products. Because the technology deal was inked just last week, Stone said Internet Explorer 4.0 won't be included in the initial shipment of NetWare 5.0, which began shipping last week, nearly two weeks ahead of schedule. "We are moving fast, though, to include Internet Explorer 4.0 in the NetWare 5.0 box in the near future," Stone said.

Stone said the pact with Microsoft won't impact Novell's arrangement with Netscape, whose Navigator Web browser has been incorporated into NetWare for about a year.

"Users will be able to download either or both Netscape Navigator and Netscape Communicator or Internet Explorer 4.0 from NetWare 5.0," Stone said. Both browsers will interface with the Netscape FastTrack Web server, which is included with NetWare 5.0. □

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FRANK HAYES

WHO'S GOING TO CONTROL THE APIs to your core business systems?

Federal Express Corp. just delivered its answer to that question. Last week, FedEx unveiled a set of application programming interfaces (APIs) designed to let corporate IS shops tie their own applications directly into FedEx's billing and tracking systems.

The new freight packages — ShipAPI, TrackAPI and IntraNetShip — are at www.fedex.com/us, and include documentation and sample code in C++, Visual Basic, Java and HTML. FedEx claims it requires "minimal coding" to stitch FedEx access into either a World Wide Web site or a corporate application.

The idea is simple: Cut out some of the clerical labor associated with shipping, billing and tracking packages —

automate the whole shebang and tie it into existing corporate systems — and shipping becomes faster, easier and cheaper, all thanks to the smiling folks in the purple and orange trucks.

Sound too good to be true? Of course it is. FedEx isn't doing this out of the goodness of its corporate heart. FedEx wants shipping customers to use FedEx instead of UPS or DHL. Stitching FedEx APIs



If it works, FedEx will break the software vendors' monopoly on APIs.

into customers' systems is a great way to sew up their business.

Still, that doesn't change the fact that customers can save money if a clerk doesn't have to manually process shipping information. And UPS, DHL and

even the U.S. Postal Service can match FedEx API for API. Any advantage FedEx gets from this stuff will only last until its competitors match its bid.

But here's my favorite part of this gambit: If it works, and customers really start using these interfaces, FedEx will finally have broken the software vendors' monopoly on APIs. Software vendors love APIs. Microsoft, IBM, SAP, Baan — the bigger the operating system, enterprise package or other gargantuan chunk of code, the more overblown and complicated the APIs. Your developers are lucky if they've mastered even a fraction of the APIs in Windows or R/3.

Meanwhile, the big chunks of code you'd really like access to — your suppliers' and customers' business systems — don't have any clean, well-defined APIs, do they? And neither do yours.

Well, they should. And there's good reason you should start developing your own APIs for your business partners to use.

For one thing, carefully designed APIs will be a lot sturdier and safer than ad-hoc Web interfaces or whatever kludges you've used to link to your partners' systems — if you've dared to do

that at all. Standard interfaces are easier for you to maintain and for your partners to code to. Best of all, you decide the shape of each transaction — the data to be used, the business rules to follow — since you've defined the API.

The downside? A lot more responsibility for you — including some potential legal liability. Offering up your own programming interfaces means you have to figure out what kind of encryption to use, how to authenticate users and how to set up secure connections.

Your code and documentation must be high quality — your business partners will rip you to shreds if it's shoddy. If your systems go down, your business partners — and your competitors — will know about it instantly.

And you'll have to convince your business partners that you won't feed them bad data or poison their systems with unfixed year 2000 problems.

But if you aren't afraid of the challenge, now's the time to grab control of your APIs. Because, just like FedEx, if you offer clean, well-designed interfaces to your business partners, you'll make it faster and easier for them to do business with you — on your terms. □

Hayes is Computerworld's staff columnist. His Internet address is frank_hayes@cw.com.

SHORTS

Starr report drives Web traffic

The Internet braced for a Web surfing tsunami Friday, when Special Prosecutor Kenneth Starr's 450-plus page report was posted on the Internet. Even before that report appeared on the World Wide Web, some of the government sites tapped to host the document were having trouble coping with the flood of people checking in. The crush of interest in the Starr report, expected to feature details of President Clinton's relationship with White House intern Monica Lewinsky, was expected to be one of the biggest events driving consumers onto the Web in Internet history.

Agencies get a 'D' grade

Federal agencies are making progress on the year 2000 problem, but not fast enough, according to the latest quarterly report card issued by U.S. Rep. Stephen Horn (R-Calif.), chairman of a House subcommittee on government technology. Horn gave agencies an overall grade of D, an improvement compared with the previous grade of F. But he said he worries that more than one-third of the government's mission-critical systems won't be ready in time.

47,642 passwords stolen

Security experts at the Computer Emergency Response Team (CERT) Coordination Center at Carnegie Mellon University in Pittsburgh last week said that a hacker used a computer in the University of California at Berkeley's mathematics department to grab 47,642 PC passwords worldwide. CERT said the unidentified hacker used a program called John the Ripper. The Federal Bureau of Investigation is pursuing the case, and university officials have changed the compromised passwords and notified the users.

Network computing, Take 2

Trying to resurrect CEO Larry Ellison's network computer concept, Oracle Corp. will announce today its Oracle8i database system, which company officials characterized as an "Internet operating system" instead of a database [CW, Sept. 7]. Ellison said Oracle8i is a reworking of his network computing concept from two years ago. He said "Internet computing" will be cheaper than client/server installations and easier to manage because users will use a browser to access data and applications managed by service companies.

Settlement in year 2000 suit

Produce Palace, Inc., a Warren, Mich.-based retailer that sued the maker of a computerized cash register system over alleged year 2000 problems in recognizing credit cards, has reached a \$260,000 settlement with TEC America, Inc., according to a report by Mealey Publications, publisher of a monthly year 2000 journal in King of Prussia, Pa. The Macomb County (Mich.) Circuit Court hasn't yet closed the case, and a spokeswoman for Produce Palace declined to comment on whether a settlement had been reached.

Traders get high-tech option

The Nasdaq Stock Market, Inc. in Washington has reached an agreement with Durango, Colo.-based OptiMark Technologies, Inc. to begin offering the OptiMark system to trade Nasdaq stocks beginning next summer, pending government approval. OptiMark is an electronic equity trading system that uses supercomputers and algorithms to match stock buyers with sellers at mutually accepted prices.

Online banking disrupted

NationsBank Corp.'s Internet and PC-banking customers were unable to access their account information electronically during the Labor Day weekend as the Charlotte, N.C.-based bank was upgrading internal software used to support those services. Customers were, however, able to access account information by using a voice response system. NationsBank Online customers were notified of the systems disruption when they logged on to the World Wide Web site during the Labor Day weekend, according to a bank spokeswoman.

SHORT TAKES IBM last week announced the Microdrive, believed by analysts to be the world's smallest hard disk drive that fits into a PC memory card slot, slated for use in digital cameras and other portable devices. ... **Oracle Corp.**, in Redwood Shores, Calif., reported a \$195 million profit for its first fiscal quarter ended Aug. 31, up 30% from the year-earlier figure. Revenue grew 28%, to \$1.75 billion. ... **Novell, Inc.** said last week that it will ship the Novell High Availability Server for NetWare 4.11 by Sept. 30. It provides businesses with automatic fail-over protection if hardware or software fails on one server. ... High-tech exports to the Asia-Pacific region fell by 12%, or \$3.7 billion, because of economic turmoil in the first half of this year, but the drop was nearly offset by export growth to Europe, Canada, Mexico and China, according to the **American Electronics Association**. ... **Avnet Computer**, a Culver City, Calif.-based division of **Avnet, Inc.**, has become a systems integrator for **Computer Associates International, Inc.**'s Unicenter TNG network management system. ... **Online investment company E-Trade Group, Inc.** in Palo Alto, Calif., has launched a free Internet-based E-mail service for investors.



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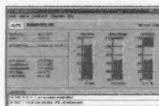
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Homer database aids security

By Stewart Deck

WHEN ST. LOUIS CARDINALS slugger Mark McGwire comes to bat these days, the defensive shift is on.

Of course, it would be futile to move outfielders and infielders around the field, given that McGwire has hit more home runs than singles this season. Rather, as McGwire approached a record-setting 62 home runs for a single season this month, Major League Baseball (MLB) officials decided to dig into a statistical database to help them move stadium security into place in the stands.

The goal was to have enough security people in place so that when McGwire clouted his his-

toric 60th, 61st and 62nd home runs, baseball officials could prevent a melee of fans scrambling for the historic balls and identify just who came up with them. Then, the fan could be escorted to safety and given space to quietly determine what to do with the piece of baseball history.

Now that McGwire has set the record, each of his home runs during the rest of this season will be a record-breaker, so the security precautions will remain in place.

To help figure out into which sections of seats McGwire was most likely to hit a home run, Kevin Hallinan, executive director of security and facility management for MLB, turned to Stats, Inc. in Skokie, Ill.

Stats can tell you that McGwire has hit 50 of his home runs against right-handed pitchers, 52 in parks with natural grass fields, 46 at night, and only four to right field. To come up with those figures, Stats uses more than 300 reporters who watch each ball game and tally pitch-by-pitch descriptions. Each reporter dials in to the company's statis-

tical system and feeds his game log into its two databases — a System 1032 database from Computer Corporation of America and an Oracle7.3 database from Oracle Corp.

"We could have told them what [McGwire's] tendencies were for each pitcher and each [ball and strike] count," said Marty Gilbert, Stats' chief operating officer.

RIGHT ABOUT HERE

Hallinan didn't ask for that level of detail. Instead, after McGwire's 59th homer, he used seating diagrams and statistical probabilities to map out sections of seats in Busch Stadium where the red-haired slugger's blasts would likely land. "We moved more security people into those sections when he was coming up to bat and moved them back out when he wasn't," Hallinan said. "And except for No. 62 [which cleared the fence but didn't land in the seats], we were right on the money."

"It was a magnificent event," Hallinan said, "and McGwire, to his credit, was like a kid at a Little League game, he was so excited."

As McGwire and Chicago Cubs slugger Sammy Sosa vie for the season's home run title and record, Hallinan has alerted National League teams to take similar security precautions.

For example, Mark Gugliel-

mo, director of stadium operations for the San Diego Padres, may bring in as many as 40 additional officers to help control outfield grandstand crowds when Sosa arrives this week.

Similarly, Scott Jenkins, vice president of stadium operations for the Milwaukee Brewers, said extra security will be in place when both McGwire and Sosa come to town later this season.

But Jenkins laughingly said he wouldn't trust the predictive models as gospel truth.

"Some model predicted McGwire would hit his 62nd home run in Milwaukee on Sept. 18, and we thought, 'Boy, that would be great,'" Jenkins said. "Then he went out and hit seven in seven games and set the record faster than anyone had predicted." □



McGwire holds aloft the record-setting ball, safely retrieved thanks to data tracking

Laptop speed not priority

By Matt Hamblen

THE COMPUTER INDUSTRY last week came out with even faster laptop PCs that sport Intel Corp.'s new 300-MHz Pentium II chips designed especially for notebook PCs.

But corporate buyers said what they really want is more durability and longevity from their notebooks.

Intel and a dozen notebook makers building machines with the new processor said speed will jump 6% to 12%, depending on the application, over the 266-MHz Pentium II introduced in April.

In the corporate market, the 300-MHz processor will let notebook users play full-screen digital video disc (DVD) movies with better quality for sales and training presentations, officials at IBM and Dell Computer

Corp. said. For example, IBM last week announced four ThinkPad notebooks with the new processor, including a model with a 6.4-G-byte hard drive, the Windows NT operating system and a price tag of \$3,899. Dell, in Round Rock, Texas, announced the Latitude D300XT, equipped with a 4-G-byte hard drive, for \$3,199.

But several users said they aren't impressed by the video playback and are more worried about practical matters, such as keeping their existing machines longer — up to three years. They want to be able to plug newer models into their existing docking stations or replace their CD-ROM drives with DVD drives.

"I can't imagine why I'd need more than the 266 MHz I already have; it's lightning fast," said Bruce Benham, vice president of information technology

at Re/Max International, Inc. in Greenwood Village, Colo. "If you use a laptop for word processing and your calendar, it's like using a cannon to kill a fly."

"The two most important things in a laptop to me are durability and the stability of the laptop and not constantly wanting to change the design," said Janet Wilson, information systems manager at Mutual Insurance Company of Arizona in Phoenix. She is ordering 233-MHz Dell machines and said she wants the next upgrade to fit those docking stations.

Industry analyst Sam Albert, president of Sam Albert Associates in Scarsdale, N.Y., said the speedy 300-MHz performance could be helpful when trying to run Windows NT on a laptop.

But Ken Delaney, an analyst at Gartner Group, Inc. in San Jose, Calif., said, "There's not a driving reason to move up" to 300-MHz notebooks. He recommended waiting for the 333-MHz processor next year. □

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- ◆ The SunPCI card, a PCI bus plug-in that will enable Sun workstations and servers to directly run Windows 95/98, 3.11 and NT 4.0 applications. The card contains an AMD K6-2 processor with 64M to 256M bytes of RAM
- ◆ Efforts to link Sun's entire line of StorEdge network storage arrays and tape libraries directly to NT environments
- ◆ Pricing: Not yet set
- ◆ Availability: Open beta in November; volume shipment slated for January-February 1999

Sun to tie Solaris to NT

By Laura DiDio
and Jaikumar Vijayan

TECHNOLOGY VENDORS, like politicians, sometimes make strange bedfellows.

Sun Microsystems, Inc. may be the only major hardware vendor to eschew the opportunity to make hardware for Microsoft Corp.'s Windows NT operating system. But last week, Sun bowed to user demands and said it will release a spate of products that increase interoperability between Sun Solaris workstations and servers and applications designed for Microsoft's Windows NT.

Sun said it is developing software technology, code-named Project Cascade, that will provide native Windows NT services — such as end-user authentication, file and print services as well as network directory services — on top of the Solaris operating system. The idea, according to Sun, is to give Solaris users the same network services that Windows NT offers in PC and server environments. The technology will become available in January or February.

"I'm happy to see this," said Dave Hyman, director of information systems at John J. McMullen & Sons, Inc., a defense contracting firm in Arlington, Va. Hyman said there has been a big push from management

in organizations to toss out Unix in favor of NT. Cascade will enable users to take advantage of Unix's scalability and reliability while at the same time providing users with Windows' graphical user interface and ease of use, he said.

Sun is also developing a PC-on-a-card hardware option that lets Sun workstation users run Windows 95/98, NT and DOS office-productivity applications — such as word processing and spreadsheets — on a Unix box. That eliminates the need for Sun workstation users to have a separate PC on their desktops for running Windows applications. Pricing and availability of the SunPCI card will be announced by the end of the year.

Also in the cards is Sun's plan to develop software that will allow its entire range of storage servers to be attached to and managed by NT systems.

The timing of the Cascade technology could benefit Sun because Windows NT 5.0 and the Active Directory have no official release date, analysts said. □

MORE ONLINE

For resources on Unix and NT interoperability, visit [Computerworld online](http://Computerworld.com).

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Migration tools a hit

► Microsoft Exchange software for Notes and CC:Mail a free download

By Roberta Fusaro

MICROSOFT CORP. last week announced free migration and co-existence tools for Notes and CC:Mail at the third annual Microsoft Exchange Conference — homing in on a problem many attendees said they face: linking or moving from Lotus e-mail systems.

The connector and analysis tools are based on technology Microsoft gained last year when it bought The Mesa Group.

Microsoft also outlined new collaboration features in the company's forthcoming Outlook 2000 messaging client, due with the release of Office 2000 early next year; and the next generation of the Exchange server, code-named Platinum.

But the migration tools, designed to help companies using Lotus Development Corp.'s Notes and CC:Mail, garnered the most attention — and the most applause — from the 4,500 attendees at last week's conference in Boston.

Joseph Fares, MIS manager at Equity Marketing, Inc. in Beverly Hills, Calif., said the migration technology comes at a perfect time for his company,

which just acquired Boston-based CMI USI.

"They're running a Notes server, and we're running Exchange [5.5] on all our servers," Fares said. CMI spent thousands of dollars to develop Notes-specific applications, "so the idea is to let [the systems] coexist, so folks could keep us-

ing what they recently spent all this money on," Fares said. "If this works, it will make life a lot easier."

But Mike Daniel, a systems analyst at Loma Linda University Medical Center in Loma Linda, Calif., was a bit skeptical and wondered how well the Microsoft tools would work.

The medical center is 85% done moving 4,500 CC:Mail users to Exchange, but it had some problems using Microsoft's CC:Mail connector — specifically corruption of data in the CC:Mail boxes. The medical center used a work-around that involved Windows NT, but Daniel said the fix reduces just the frequency of the problems.

The CC:Mail Importer announced last week moves archived files to Exchange, allowing users to preserve business-critical information in their personal E-mail folders.

The Notes migration tools in-

clude an application analyzer, which categorizes Notes databases based on usage and types of applications and provides a snapshot of what will be converted to Exchange; a connector to link Notes and Exchange environments; a conversion assistant to convert all or part of Notes applications to Exchange; and an importer that moves Notes mailboxes to Exchange.

The tools can be downloaded for free at Microsoft's Web site. The analyzer is available from resellers because of the complexity of the reports generated, Microsoft officials said. □

Directory integration a concern for Win NT

By Roberta Fusaro

WINDOWS NT 5.0 is still in beta release, but Microsoft Exchange users are concerned about whether the operating system's improved directory will work with the directories in their messaging servers.

Exchange runs on NT and has its own system directory. But the next version of Windows NT — which is in Beta 2 release — also will feature the full-scale Active Directory.

In a session on Exchange and the Active Directory at last

week's Microsoft Exchange Conference in Boston, Microsoft Corp. officials said current Exchange users will be able to use a connector in Active Directory to replicate directory information — such as addresses and E-mail distribution lists — from Exchange to NT and vice versa.

The switch won't be apparent to the user but should improve network performance and ease administration, officials said.

The connector will be available in NT 5.0 and Platinum, the next generation of the Exchange server. Microsoft hasn't

provided ship dates.

Mark Harris, a systems engineer at the Washington law firm Howrey and Simon, said the directory integration issue is critical to the firm's 1,000-plus Exchange 5.5 users spread out in offices in Washington, Los Angeles and Menlo Park, Calif.

"If there is no integration, [Exchange and NT 5.0] must be managed separately. That's not necessarily evil, but it does require two totally distinct, almost unrelated administrative functions," Harris said.

REASON TO MOVE

Harris said the Active Directory connectors and options will let the law firm provide closer ties between Exchange and Windows NT 5.0. His firm will be looking at that as a reason to

move to NT 5.0, Harris said.

But other users said the products will prove themselves only after they start shipping. Frederick Klein, an information technology manager at GTE Corp.'s Government Systems division, based in Chantilly, Va., said he wondered how relevant all the advance information was, given that the products themselves probably won't be available for about a year.

Mike Daniel, a systems analyst at Loma Linda University Medical Center in Loma Linda, Calif., agreed. "I was hearing about Platinum [and Windows NT] in the keynote [speech] last year, and they're still talking about it," he said. "It's all good stuff coming, but [that] doesn't help us with the day-to-day problems we're dealing with." □

Consultants' travel costs

CONTINUED FROM PAGE 1

costs," he said.

Hafer isn't alone. As consultant travel expenses continue to climb, to as much as one-fourth of total information technology project costs, more users are jamming the brakes on runaway consultant expenses.

"We are seeing systems integrator proposals where travel expenses are being budgeted at 20% to 25% of fees, which is many times the cost of the software," said Vinnie Mirchandani, an analyst at Gartner Group, Inc. in Stamford, Conn.

Some users are responding by setting strict caps on consultants' lodging and meal costs. Mirchandani recommends capping travel costs at 10% of the consulting firm's bill, which often works out to about \$150 per day per consultant.

Others are negotiating so-called all-in-one deals, which

lump consultants' travel and other living expenses into the overall project price. That shifts the burden of policing costs from project managers to the consultants themselves.

At Mycogen Feeds, a Minneapolis-based division of Dow Agrisciences Corp., the 11 consultants from Clarkston-Potomac working on the company's SAP AG R/3 project must pay for their own meals. The consultants' other expenses, including travel and lodging, are capped at \$1,250 per week.

And it is up to the Durham, N.C.-based consultancy — not the client — to ensure that consultants stay within their budget, said Christine Myers, Mycogen's SAP implementation manager. So far, off-loading the budget responsibility has paid off. The first month on the job, Clarkston-Potomac's consul-

ants spent 20% less than what was budgeted for travel.

"I've never before worked with a consulting company that has been so involved with making sure they stay under budget," Myers said.

Sterling Diagnostics Imaging, Inc. in Greenville, S.C., has been able to keep consultant travel costs down to 10% of overall SAP implementation project costs by doing exactly the opposite.

SAP project manager Christine Vincent is very much involved in planning consultants' work, always looking for ways to minimize their travel and, in

turn, Sterling's own costs. Sterling also limits consultants to hotel expenses of \$70 to \$120 per night and food expenses of \$10 to \$20 per meal.

To cut down even more on consultant travel costs, Gartner Group said, users should consider moving a part of their IT work — such as data conversion and software configurations — to consultant development centers. Virtually all of the Big Six and many of the boutique con-

Ernst & Young LLP, for example, has 18 centers and plans six more. Chicago-based Grant Thornton is taking a regional approach, locating its consultants in about 45 cities across the U.S.

And last week, Plaut Consulting in Waltham, Mass., launched an off-site, rapid implementation service that it said will cut as much as two months from a SAP project that would take six months with consultants working at the client's site.

Because the consultants travel less, project costs also will drop by as much as 30%, said Larry Perlov, project manager for the new off-site program.

But back in Tampa, Hafer has what he said is an even better idea — hire locally.

"When you hire a local, it's a win-win situation," he said. "The consultants are happy because they're home. And the user tends to get more productive time out of them because they don't cut out early on Friday to catch a flight back. You get more work out of them." □



R/3 consultants must be responsible for budgeting.
— Christine Myers, Mycogen

sultancies have set up such centers as a means of speeding up projects and attracting experienced but travel-weary consultants.

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Web aids Swissair response

► Airline coordinates reaction via 'net after crash

By Sharon Machlis

AT 5:30 A.M. Sept. 3, Andy Guenthard got the call that every airline employee dreads: One of the company's planes had gone down.

Within 30 minutes, Guenthard, manager of electronic-commerce at Swissair, and half of his eight-member team already were at work so the Zurich-based airline could use the Internet to help people cope with the tragedy's aftermath.

"Everybody is under complete stress," Guenthard said. "Whatever technology is there, let's use it."

By 7 a.m., the team had updated the company's home page on the World Wide Web with information about Flight 111 as it became available. Soon, E-mail messages began to come in from frantic relatives and friends who thought they had loved ones on the downed New York-to-Geneva jet.

"We tried to respond to every E-mail we received within three minutes," Guenthard said. Messages were turned over to the

airline's special crisis care team. For any E-mail that included a phone number, a Swissair specialist telephoned the family member or friend immediately, Guenthard said.

The passenger list couldn't be released until airline officials were completely sure of its accuracy and, because of U.S. law, families of all U.S. passengers onboard were notified. Once the list was made public, it was posted on the Swissair Web site as well.

To deal with the international crush of media seeking information about the crash, Swissair officials told reporters that all public statements and press releases would be available on the Web site.

CONCERN FOR FAMILIES

"The Web did help a lot," said Hans Klaus, a Swissair spokesman in the airline's public relations department.

Swissair generally has received high marks for the way it has responded to the tragedy, namely by trying to care for victims' families and release information promptly.

"When you have a crisis, every system, every person, every operation you have is put under enormous stress. In most cases, organizations do not react well," said Robert Dilenschneider, a crisis management consultant at Dilenschneider Group in New York. "Swissair has done a terrific job. It's a model of how a crisis ought to be handled."

Putting information on the Internet is one example of how the company is properly communicating with victims' families, the media and the public at large, he said.

By 7:30 a.m. Swiss time, when news of the accident first hit national TV and radio news programs, traffic to the Web site soared. Swissair contacted its Internet service provider, saying it would need extra bandwidth, and shut down all unnecessary resource drains — even software that logs site traffic — to cope with the flood of users.

The revamped www.swissair.com site was treated as a news service, with regular updates. The uniform resource locator brought up a text-only opening page about the accident with a link to the airline's regular site.

"It's very fast to put news up there," Guenthard said. "We didn't want to make a multi-



A grieving relative of a victim killed in the crash of Swissair Flight 111 wipes away a tear during a visit to the water's edge in Peggy's Cove, Nova Scotia

media spectacle out of it; that wouldn't be appropriate."

Along with queries about passengers, Swissair started to receive hundreds of E-mail messages that simply expressed sorrow about the tragedy. The day after the crash, the electronic-commerce group added a condolence book for people to write messages of sympathy.

"This is the best feature we could think of," Guenthard said.

About 1,500 messages poured in the first day it was up; there were 4,500 or so late last week.

Victims' families can see all the messages, and any E-mail that mentions a specific passenger or crew member is sent to that person's survivors. The electronic-commerce team also sees the messages, which gives them and fellow airline employees an outlet for their own grief. □

IT managers batten down the high-tech hatches

By Stewart Deck

IT'S HURRICANE SEASON again, and as the winds begin to howl, information technology directors are making sure their emergency wet-weather plans are tied securely.

Ed Griffin, IT manager at Blumenthal Mills, Inc. in Marion, S.C., thought he had his 600-employee textile manufacturing firm well-prepared for the wrath of Hurricane Bonnie last month.

Blumenthal Mills uses Mimix software from Lakeview Technology, Inc. in Oak Brook, Ill., to create a duplicate image of its IBM AS/400-based systems on other AS/400s in a New Orleans branch office. That redundant system can then direct the company's manufacturing plants, which produce 1,800 rolls of mattress ticking and upholstery each day.



IT managers need to be ready for all imaginable storm scenarios, such as power outages that resulted when lines went down last month during Hurricane Bonnie

The backup system worked during Hurricane Bonnie, but local power surges nevertheless put systems on the fritz. "The power was off and on so many times for two days that it overheated our [uninterrupted power supplies] and caused some system failures," Griffin sighed.

A disaster contingency plan should try to cover all possible failure scenarios, said Moshe Roznitsky, professional services director at Total Network Solutions, Inc., a New York-based consultancy. And testing the plans at least once per quarter is vital. "If you don't keep test-

ing, you don't know when network changes will require a change in the plan," he said.

When Ed Clark joined Hatteras Hammocks, Inc. as MIS manager this spring, he was surprised to discover that the company didn't have a disaster contingency plan, even though the Greenville, N.C.-based manufacturer is smack in the middle of the path of many hurricanes. Clark quickly went to work, and when Hurricane Bonnie kicked off this year's hurricane season, he was ready.

DAILY BACKUP

Clark runs a daily system backup and copies a full system backup onto 8mm tape — which he takes home — when one of the big summer storms heads toward North Carolina. He also contracted with Sun-Gard Recovery Services, Inc. in Wayne, Pa., to provide replace-

ment equipment or to remotely operate the company's computer system in case of a natural disaster.

"Our company president said we might be able to exist for two days without our computer system. So selling him on the idea of an emergency plan wasn't too difficult," Clark said.

Rick Tanner has found a high-tech assistant to help him monitor storms. The acting director of disaster recovery at Northern Telecom Ltd.'s global data center in Research Triangle Park, N.C., relies on hourly E-mail updates from a storm-tracking site on the World Wide Web (www.storm8.com).

When big storms head his way, Tanner calls for a tanker truck filled with diesel fuel to park nearby, ready to fuel power generators for the 4T-byte data center. "We lost power for six days during Hurricane Fran two years ago," Tanner recalled. "So now we think having the truck come is a cost-effective way to make sure we stay running." □

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Supplier seeks sales via Web searches

► Efficient product queries goal of partnership

By Sharon Machlis

W. W. GRAINGER, INC., which sells maintenance and repair equipment, plans a major overhaul of its Internet-based catalog operations to make it easier for customers to find what they're looking for.

Inaccurate, unhelpful search engines have long been a complaint of consumers surfing the World Wide Web. But for Grainger, helping corporate customers pinpoint the parts they need is a linchpin of its \$4 billion-per-year business.

"There's nothing 'special'

about our products. You can get them anywhere," said Don Bielinski, group president at the Lincolnshire, Ill., company. "Where we help is in the busi-

Requisite Technology will electronically catalog Grainger's products and develop relevant search questions for the site.

ness process." That means carrying a broad array of products — everything from lighting to motors to security products, for one-stop shopping — and making it quick and easy to order.

Speed has become a key

value-added ingredient, he said.

If a Grainger customer needs, say, a replacement motor for an air compressor, the buyer will typically leaf through the company's thick red paper catalog that lists 70,000 products and search for the appropriate motor — often calling a sales assistant for help before ordering.

On the Web, a customer might enter "motor" and then still have to wade through dozens of listings.

The new site, expected to go live next month or in November, will come back with a series of questions once a user enters a product type. For motors, that might mean queries about brand name, enclosure, horsepower and revolutions per minute.

Grainger has entered into a

"multiyear, multimillion-dollar" deal with Requisite Technology, Inc., based in Boulder, Colo., in which Requisite is to electronically catalog Grainger's products and develop relevant search questions.

Large numbers of technology vendors are jumping into the electronic procurement market, said Geri Spieler, an analyst at

Gartner Group, Inc. in San Jose, Calif.

Though the deal with Grainger should help Requisite get noticed amid the market noise, Spieler said, she is less certain how much it will help Grainger grow or retain its business. "We need to see in six months if Grainger customers have implemented this," she said.

Web sales account for less than 1% of Grainger's business, but are "the fastest growing thing we have," Bielinski said. □

CORBA 3.0 promises plug-and-play ease

► Support for Component Model a key feature

By Tom Diederich
SAN FRANCISCO

THE UPCOMING Version 3.0 specifications for the Common Object Request Broker Architecture (CORBA), the translator that lets different applications communicate with one another, have users looking forward to a plug-and-play application development world.

The goal of CORBA 3.0, its backers said, is to make the application development standard easier to use in a distributed environment.

The Object Management Group (OMG), the organization of 800 member companies that administers the CORBA specification, plans to publish details of Version 3.0 in the first half of next year.

OMG unveiled the latest CORBA initiative last week at Comdex Enterprise '98.

Executives from IBM, Imprime Corp. in Scotts Valley, Calif., Dublin-based Iona Technologies, Inc. and BEA Systems, Inc. in San Jose, Calif., among others, said they would release future products that will support CORBA 3.0.

The new specification's key additions include integration of Internet and Java technologies and support for the Component Model — a cross-language, cross-platform model that specifies a framework for plug-and-

play software objects.

Kent Wreder, corporate director of object technology at Baptist Health Systems of South Florida — a Miami-based group of five hospitals — said CORBA 3.0 will serve an integral role in day-to-day operations.

"Over the last 20 years, we've accumulated about 150 systems that each hold a fragment of the patient record — be it an image, a transcribed report, lab data or nurses' notes," Wreder said.

CRUCIAL TO USERS

In 1996, Baptist Health Systems turned to CORBA as a way to connect those systems. "As we move forward, 3.0 is very important to us because we want to be able to send clinical information [to one of the 2,000 member physicians] that's relevant" to a patient's needs, Wreder said.

"We see the combination of components and [other features] as the mechanism for us to do that, since the applications themselves

are already CORBA-based and online," he added.

OMG Chairman and CEO Richard Mark Soley said application vendors need to standardize the way they implement component-based software so that users' applications "will be portable from one CORBA implementation to another. That's what CORBA 3.0 is aimed at." □

Funding begins for Internet domain group

By Matt Hamblen

A CONSORTIUM of 13 companies with sizeable stakes in the future of the Internet has begun raising \$500,000 to support a new nonprofit organization for managing domain names and IP addresses worldwide.

The Clinton administration issued a white paper in June recommending the nonprofit to take over the government's domain-name role.

The report doesn't prescribe funding, but sets up guidelines and recommends a nonprofit group be formed.

That's because the government will terminate its contract with current domain-name provider Network Solutions, Inc. (NSI) in Herndon, Va., on Sept. 30.

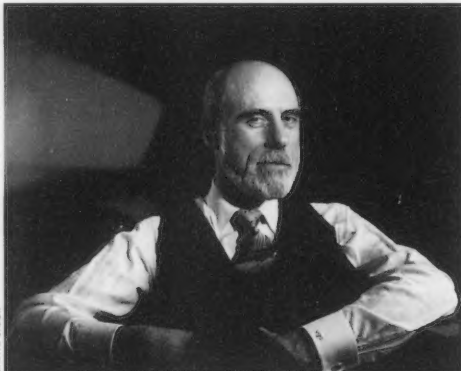
Three companies in the consortium, called the Global Internet Project (GIP), and two other companies outside it have contributed \$135,000 to the fund so far, GIP officials said last week.

Gifts are capped at \$50,000 each.

The three GIP members who contributed are IBM, MCI Communications Corp. and GTE Internetworking.

Ascend Communications Corp. and Cisco Systems, Inc. are helping from the outside, GIP officials said.

All five gave roughly equal amounts, Vinton Cerf, senior



MCI's Vinton Cerf says there seems to be a worldwide consensus for creating a nonprofit Internet address manager, but there is still concern over how to run the entity

vice president of Internet architecture at MCI in Washington, told reporters. The funding is important, given the government's Sept. 30 expiration date for the NSI contract, Cerf said.

Cerf and John Patrick, vice president for Internet technology at IBM and chairman of GIP, said there seems to be a worldwide consensus for creating a nonprofit manager, but there is concern on how to constitute a board to run the entity.

The Internet Assigned Numbers Authority, which manages the numbers used in IP addresses under government authority, last month recommended a nonprofit board of nine to

19 members, to include a broad range of representatives.

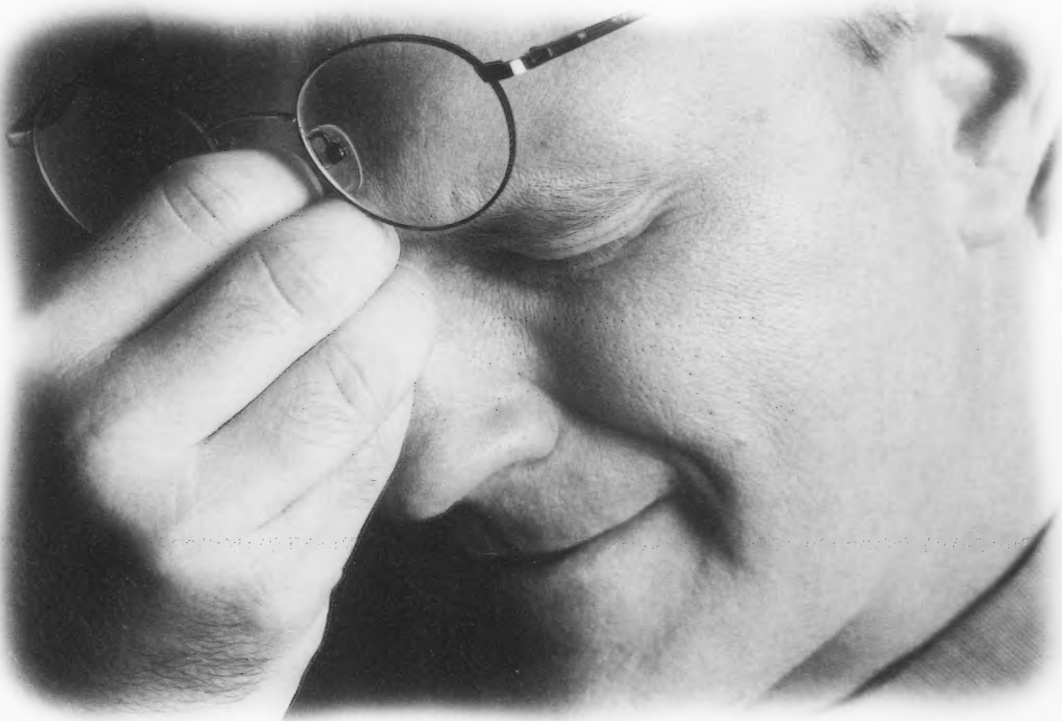
The lengthy proposal is posted at www.iana.org.

B. K. Delong, director of the New England Chapter of the World Organization of Webmasters in Boston, welcomed the fund-raising drive, saying the nonprofit will need start-up funding.

The companies raising the money have a "big stake in the Internet," Delong said. "But I wouldn't say there's any danger afoot in their making contributions as long as the nonprofit board eventually has educational or nonprofit members, as well as businesses." □

The goal of CORBA 3.0 is to make the application development standard easier to use.

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Generation X: Skills training trumps pay

By Barb Cole-Gomolski

HEFTY SALARIES and bonuses are great, but information systems departments should plan to spend big on training if they want to attract and retain Generation X workers.

A survey by The Gallup Organization in Princeton, N.J., released last week showed that training is a major draw for employees born between 1963 and 1977. In fact, Gen Xers said they are more likely to stay with companies that invest in such programs.

"The old mentality of corporate loyalty is archaic to Generation X," said Steve Berman, president of Paladin, Inc., a Cherry Hill, N.J., consultancy that specializes in retention. "[Gen Xers] expect to change jobs every two years, so they don't expect to work their way up the

corporate ladder," he said. Instead, they look at jobs as opportunities to acquire hot skills for their move to the next opportunity, Berman said.

That is especially true in the IS field, where workers with the hottest skills — in areas such as enterprise resource planning, knowledge management, data mining and technologies related to the World Wide Web — are increasingly sought after.

Jada Brock, 29, an information technology consultant at Cereus Bandwidth in Atlanta, agreed that training is key for younger workers. "You have a better edge in the marketplace if you get training in hot skills," she said.

TRAIN ME

A new Gallup poll suggests employers must invest in training to retain workers ages 21 to 35. Of those polled:

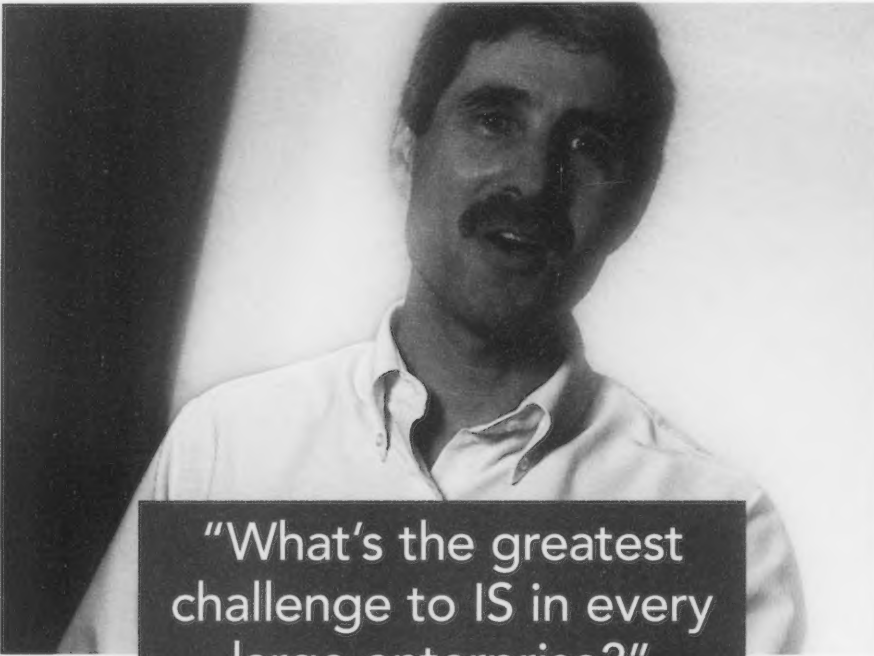
84% who got at least six days of training were satisfied with their jobs

80% said training was a factor in accepting new jobs

58% said training was useful in preparing for higher-level jobs

Base: 1,012 employees in U.S. companies

Source: The Gallup Organization, Princeton, N.J.



"What's the greatest challenge to IS in every large enterprise?"

Ross Altman, Research Director, GartnerGroup

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Gen Xers' focus on acquiring skills comes across loud and clear, according to Al Jones, manager of college recruiting at American Management Systems, an information technology consultancy in Fairfax, Va. "They tell you that they are interested in learning new things that will help them in their career down the road," he said.

To some staffing managers, that looks like a no-win situation because they have to invest in training only to see Gen X workers wooed away by competitors.

But it doesn't have to be that way, according to Bruce Tulgan, author of *Managing Generation X* and president of Rainmaker Thinking, Inc., a consultancy in New Haven, Conn. "Since Gen Xers value training, the training should never end," Tulgan said. He encourages companies to put IS recruits through a boot camp that may take a few weeks, then offer them training on a real-time basis.

One of Tulgan's clients, Deloitte & Touche Consulting, lets workers glean insight from experts in the firm using a knowledge base stored in its Lotus Notes system. "The important thing is to give them the training when they need it and not make them wait until next month — or even next week," Tulgan said.

The Gallup poll showed that workers see room for improvement in the quality of the training they get; only half of the respondents gave their training high marks. The survey showed that employees want a choice in the training they receive: 27% want training in new technology; 15% in job skills; 16% in communications skills; and 14% in management. □

"How does Gulf Canada pump out reliable budget data?"

We use WebFOCUS."



"WebFOCUS gave us the budget control we need – on a fast development cycle."

Alice Bienia
Technical Services
Gulf Canada

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OPINION

Sending a message The pretrial proceedings of U.S. vs. Microsoft have yielded a tantalizing bit of corporate intrigue: E-mail snippets from Microsoft and Netscape that have been released by both parties in the case.

The documents show executives conspiring to annihilate one another with all the vindictive glee of 10-year-olds in a school yard. This corporate voyeurism has been fascinating, but it should send a chill down your spine if you are responsible for administering E-mail. You may want to route copies of these messages to users with a Post-it note asking, "Could this be you some day?"

E-mail has become part of the fabric of many corporations. At companies such as Microsoft and Netscape, it's an essential part of the culture. But as users get comfortable with zapping gossip, competitive intelligence and dirty jokes among their

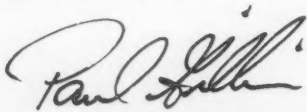
computers, it's easy to forget the unique power of the medium.

Messages sent on E-mail don't evaporate like chit-chat in the cafeteria. E-mail

is a traceable, searchable, archival, self-documenting medium for exchanging documents. As the Microsoft discovery process shows, the E-mail note you send today may turn up in a personnel file or court proceeding some day.

A couple of years ago, I adopted a philosophy of assuming that every E-mail I send outside the company could eventually wind up in print, in a newsgroup or on somebody's Web site. The practice has served me well — especially when some of the more vitriolic E-mail I get entices me to respond in kind.

But I wish I could say the same for my electronic musings within the walls of the company. Unfortunately, I am as guilty as anyone of letting rumor, anger and sarcasm occasionally creep into messages to my colleagues. The Microsoft case has given me pause to reconsider. You might reconsider, too. If the judge in the antitrust case allows E-mail to become an essential part of the proceedings — and that's still a big if — it should spur every corporate E-mail administrator to revisit company policies. The department watercooler is going electronic, and with that comes a host of accountability issues.



Paul Gillin, editor in chief
Internet: paul_gillin@cw.com



LETTERS

Musical abilities dance to the programming beat quite well

THANK YOU for your article on "Crazy correlations" [CW, July 20]. In my "past life" I was a ballroom dancer. People always thought it was the funniest and most unlikely thing in the world when I fell in love with programming and database administration.

Using metaphors from a past career is crucial to me. Seeing a whole dance routine as a final production and seeing a client/server database application in its entirety don't seem very different at all to me.

I always enjoy your magazine and start hunting down the mailman if it's even a day late.

Danielle E. Chard
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IFOUND Computerworld's story about the correlation between musicianship and programming aptitude ["Crazy correlations," CW,

July 20] very intriguing, given my 35 years of serious music study and 25 years as a programmer. However, the writer and the interviewees seemed to be grasping to find the correlation ("pattern recognition," "reasoning skills" and "structured environments"), while the painfully obvious was overlooked: Musical notation is a programming language. It even has provisions for condition-

al loops, go-to's and subroutines. The idea of hiring musicians to fill programming vacancies is not new. A fairly famous urban legend is that, during the 1950s, with the data processing and computer science programs not yet invented at most schools, IBM quickly identified the musician/programmer connection and recruited music majors to fill its programming departments.

Mike Musick
St. Louis
mcm@directory.talx.com

AS/400 relational database capabilities maligned

IAPLAUD YOUR magazine for publishing an article lauding what I believe is the best business computer in the market: IBM's AS/400 ["AS/400 keeps chugging," CW, July 13].

Yet in the same issue is an article ["Payment system saves builder's time"] that states that the company mentioned "was being held back by its computer system — an AS/400 that stored financial information in unconnected files rather than a database." I challenge that statement as ignorance. The

AS/400 is nothing if not a database machine. It is the only one I know of that has a relational database (and a very good one — DB2/400) integrated into the operating system, not a separate product.

True, it is possible to design and implement a bad system. But this is misleading, at best.

Michael Polutta
Senior programmer/analyst
Circuit City Stores, Inc.
Richmond, Va.
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Survey-free zone saves time

ABOUT TWO YEARS ago, as an IS manager, I created a department policy that we do not take part in surveys. (I make an exception for periodicals that I subscribe to.) I have saved 30 hours of time.

In the vein of executive editor Maryfran Johnson's column ["Survey stupor," CW, July 20], would you say you save up to one hour per month, one to two hours per month, etc., by not taking part in surveys? Just say no to surveys!

Skye Hagen
Couer D'Alene, Idaho

Did someone say Microsoft?

MICROSOFT IS to computer software what McDonald's is to food. Few people will admit to liking the taste of McDonald's food, choosing instead to defend it on functional grounds (quick, cheap, etc.). Many people, including many in the government, decry McDonald's food as an evil (unhealthy, high in fat and cholesterol, etc.). But everybody buys McDonald's food, and if it disappeared tomorrow, we would all miss it terribly.

Tony Hohenbrink
Cape Town

Computerworld welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

Year 2000 is the tip of a menacing iceberg

William Ulrich

The year 2000 problem is exposing an ugly side of large organizations. Many blame IT for moving slowly to address the year 2000 challenge and for underestimating the overall scope of the effort.

But when IT went to executives for funding, they were stonewalled. That stonewalling on the funding issue is just one example of the business community's penchant for bad judgment when it comes to leveraging IT.

Business units remain stuck in neutral in dealing with the year 2000 problem while remaining blind to the greater dangers and opportunities ahead. From a tactical perspective, businesspeople haven't effectively addressed their end of the year 2000 problem. While IT has corralled the bulk of its systems assets into workable inventories, business teams are just coming to grips with supply-chain and non-IT systems challenges. The number of suppliers and business partners can reach into the tens



Businesspeople haven't effectively addressed their end of the problem.

of thousands, but users have little understanding of the relative priority — or even the existence — of many of them. Considering that executives have stated that suppliers are an unknown risk in Securities and Exchange Commission (SEC) 10K filings, it seems that issue would be a top priority. Addressing year 2000 problems in non-IT systems is another area where business units have lagged.

Distributed systems, spreadsheets and rogue technologies have proliferated outside the purview of IT and audit teams. Asset mismanagement and poor preparation by users mean those systems will

likely encounter many year 2000 failures. Embedded technologies — common in devices ranging from security systems to automated assembly lines — also suffer compliance problems. Yet business managers responsible for those systems are still in the early stages of building inventories and ordering replacement parts.

While tactical business unit preparations for the year 2000 lag, senior executives pursue strategies that make a bad situation worse. Initially, year 2000 funding requests were denied.

That slowed project mobilization. Recently, IT has been trying to obtain funding for business continuity or contingency planning. Executives were slow to sponsor and fund the creation of contingency plans until SEC filing requirements demanded it.

Corporate directors also continue to defy logic by pursuing merger-and-acquisition activities despite knowing that the year 2000 problem is far from contained.

Earlier this year, Citicorp and Travelers merged to create a year 2000 project with a combined budget of \$875 million. But was year 2000 considered during

boardroom discussions leading to the merger? We may find out, if a year 2000 problem leads to a class-action claim against the newly created company.

Other organizations are also launching business initiatives, including the euro conversion, in spite of the fact that year 2000 projects require many of those same resources.

Denying critical funding, ignoring the consequences of asset mismanagement and not considering technology issues when making strategic business decisions have all magnified the year 2000 problem. IT must clean up its act and has taken steps in that direction.

But IT issues are insignificant compared with the more far-reaching issue of failing to comprehend the strategic impact of IT on a company.

We will survive year 2000, but it is only the beginning of a rocky ride if businesses don't clean up their acts. □

Ulrich is president of Tactical Strategy Group, Inc. and executive vice president of Triaxsys Research LLP. He is co-author of The Year 2000 Software Crisis: Challenge of the Century and The Year 2000 Software Crisis: The Continuing Challenge. His Internet address is tsgrinc@cruzio.com.

Who will answer the private doorbell?

Emily Frye

You know how difficult it can be to protect information once it's in digital form. That's why encryption is an essential tool for business, government and individuals.

The information's owner can control access, just as he could if the materials were on paper and placed in a vault.

From law enforcement's point of view, however, encrypted materials present an obvious problem: If someone is suspected of shady activity, the police can't get a warrant, walk in and blow the lock off the vault.

That tension has stretched on for almost a decade, with no real compromise in sight. Perhaps the absence of a solution is the result of a common human failing: seeking a comprehensive answer to a difficult question. Another way to solve a large problem is to take it apart and address it piece by piece.

Recently, Cisco Systems presented a concept that moves the encryption discussion forward precisely because it doesn't attempt to do too much. Cisco proposed a "private doorbell" scheme that's easy to understand. Some type of

organization (your employer, say, or an Internet service provider) manages almost every point of access to the Internet. Thus, such organizations serve as de facto doormen.

Under the Cisco plan, before information is encrypted to pass safely through the "door" onto the "net" and after it has passed through the door on the other end and decrypted, the doorman has an opportunity (with the assistance of routers) to pull out messages that law enforcement has identified in a warrant.

Cisco's private doorbell is bound to generate intense discussion. On the positive side, it may render moot one of the issues that divides private industry and law enforcement: real-time decryption.

Law enforcement has pressed hard for the industry to develop the capacity to decrypt scrambled messages as they pass over the

Internet. Industry has resisted. If the private doorbell becomes a reality, the argument for real-time decryption loses much of its force.

Materials move so rapidly in cyberspace that the justification for real-time access no longer holds water. If critical material can be collected at either end, what difference will a few minutes (or less) make?

Cisco's proposal would also leave industry free to develop models for encryption-key recovery that satisfy business — not government — needs.

Several organizations have begun to build such business models for key recovery but have been hampered by confusion about what the government may require. Under the private doorbell plan, those



A recent encryption proposal, though imperfect, moves the issue forward.

models could succeed or fail on their own merits.

There are plenty of concerns in a private doorbell implementation. Systems and access control on either end of the Internet message stream are the biggest challenges. Who should have custody of digital materials between the sender and the Internet or between the Internet and the intended recipient? There is some case law that can provide guidance, but the matter is far from settled.

Privacy advocates point out that almost every step taken to ease Internet transactions also decreases personal privacy. Authority given to doormen and law enforcement under the private doorbell plan would be no exception.

Discussions about encryption have a long way to go before they result in a consensus. But by chewing on a piece of the problem, Cisco shows that encryption is not a single, impenetrable puzzle. Rather, it presents many difficult questions that should be worked out one by one. □

Frye is a Chicago attorney who practices in the area of high-technology law. Her Internet address is emiliefrye@ibm.net.

Limited (stock) options in Silicon Valley

Dan Gillmor

If Silicon Valley and the technology industry in general are an economic rocket ship, stock options fill one of the fuel tanks.

So when the Dow Jones industrial average took a 513-point whack two weeks ago and then, after a brief recovery, continued down for the week, it was as if a booster rocket were sputtering, maybe flaming out entirely.

More than any place else on the planet, stock options are a normal part of the compensation package at technology start-ups, some of which have grown exceedingly big. In a market where the overall trajectory has been up, they've rewarded excellence and mediocrity alike, allowing companies to get ahead by persuading Wall Street investors to pay the major part of some extraordinary deals. Microsoft, for one, has used this method for years.

The economic bumpiness, which con-



IT workers who've forgone the lure of the start-up needn't feel like chumps in today's economy.

tinued last week, has brought a long-needed reality check to the IT industry. By any rational accounting, the rocket was close to veering out of control, with share prices reaching absurd levels even for firms that showed scant prospect of profits in the foreseeable future.

Please don't misunderstand: Options are a certifiably good thing. Handled properly, they reward employees by giving them a genuine stake in the success of a business.

But they also have encouraged, in the

red-hot Silicon Valley economy, some less-worthy behavior. People have learned to treat their careers in what Mitchell Kertzman, CEO of Sybase, likens to momentum investing, where investors ride market trends until the first sign that a company may (it always does) hit the wall. Then they bail out. Translated to employment, a worker's loyalty to a company lasts only as long as it looks like the options might be worth something. It's all too routine for Valley employees to job hop

each year and to demand even better packages from their latest employer.

But suppose, for the first time in the lives of the twenty- and thirtysomething tech workers, that the market's overall trend is down or flat. And suppose that technology stocks begin to behave the same way. A lot of things would change.

Some IT pros may have felt like chumps the past few years, earning a steady salary in a corporate shop when, if they managed to join precisely the right start-up at precisely the right time, they could have gotten rich enough to

buy a house in overheated Silicon Valley. If so, it's safe to say they don't feel like chumps anymore. After all, they have job security — or what passes for it today — and a decent retirement plan.

And if options at IT companies begin to be less attractive, will life be easier for hiring managers at corporate IT shops? They've been complaining for a few years that they can't compete with vendor companies. The stock market drama may have helped swing the pendulum back in favor of the safe-and-steady corporate shop.

Tech salaries are beginning to moderate, according to *Computerworld's* latest survey. But if options fade as a realistic form of compensation in most cases, IT managers will need to find other ways to keep the best people around, and that could mean raising some salaries. The job-hopping tendency of workers might also ease, however, if the prospects for big money — usually a function of options potential — fade somewhat as a lure. □

Gillmor is technology columnist at the San Jose Mercury News. His Internet address is dgillmor@sjmrcury.com.

Two Bills on the hot seat

David Moschella

Apparently, William H. Gates III and Microsoft have learned very little from the escapades of William Jefferson Clinton and his White House spinmeisters. So far at least, the world's wealthiest person appears to be defending himself and his company in pretty much the same manner as the world's most powerful leader.

And the way things are going, the results for Microsoft won't be a whole lot better.

Indeed, at times the two Bills seem to be operating out of the same legal playbook. Like the White House, Microsoft has pursued a strategy of self-righteous denials, frivolous legal claims, frequent procedural delays, convenient memory lapses, secretive testimony and, most distressingly, sharp attacks on its perceived enemies. In another time, each of those tactics might have seemed normal — even appropriate. But in today's environment, they just tap in to our deep disgust with the entire Clinton debacle.

"Clintonesque" is certainly the easiest way to sum up Microsoft's recent attempts to do the following:

- Obtain a summary judgment to dismiss or limit the entire Department of Justice antitrust suit.
- Prevent Gates' testimony from entering the public domain.
- Deny that the company has a monopoly on PC operating systems.
- Apparently quibble about whether there really is a market for browsers or PC operating systems. (Of course, this is the same company that insisted that Windows 95 and Internet Explorer really were integrated products.)

All those parallels might just seem to be unfortunate coincidences for Microsoft if it weren't so obvious that the main motive for both Gates and Clinton is to avoid confronting the truth.

That's the truly worrisome parallel. Just as the president's lies regarding the Monica Lewinsky matter grew from his all-out effort to end the Paula Jones case, so is Microsoft's current legal chicanery aimed at covering up its no-holds-barred assault on Netscape. As I've been writing since 1996, when Microsoft deliberately chose that course, at that juncture the company forever branded itself as a predator-at-large. It's too late to start denying it now.

Don't be surprised if the parallels between the two Washingtons continue. Clinton's reputation is in tatters, his presidency at risk — even the Jones case might be reopened. Similarly, Microsoft's public image has changed in some quarters from that of a great American success story to that of a brutal and insatiable competitor. Its words and actions have only embold-



Gates and Clinton seem to be operating out of the same legal playbook.

ened Justice Department lawyers.

All that's required to complete the symmetry now is for Netscape shareholders to sue Microsoft for billions in compensatory damages. Like Clinton with Jones, Microsoft will then wish it had settled out of court. A few months from now, the Justice Department's original demand that Microsoft distribute Netscape's Navigator along with Windows will look like a very small price to have paid indeed.

Underlying all the legal similarities is, of course, a common human dimension. Just as Clinton has refused to accept the personal responsibilities that come with his great office, so has Gates failed to acknowledge and accept the special standards that come with his immense market power. It's that failure to adhere to established societal norms that has landed both men in such trouble. Clearly, Clinton's offenses are infinitely more blatant and disgraceful. But in the end, both men will be shown to have abused their power — and both will be punished for it. □


Moschella is an author, independent consultant and weekly columnist for *Computerworld*. His Internet address is dmoschella@earthlink.net.

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Briefs

JOB-HOPPERS

The average thirtysomething U.S. worker has held an average of nearly nine jobs between the ages of 18 and 32, with most of the job switches happening before age 27.

Source: U.S. Bureau of Labor Statistics, Washington

Retail decision support

Crate & Barrel, a \$400 million specialty housewares retailer in Northbrook, Ill., has licensed Alameda, Calif.-based Intrepid Systems' DecisionMaster decision-support system. It plans to run the software on its IBM AS/400 to support merchandising, assortment planning, reordering and other functions.

Insurance extranet

The National Association of Professional Insurance Agents has hired Atlanta-based HomeCom Communications, Inc. to build an industrywide extranet system designed to provide full transactional capabilities to select members. The system will feature single sign-on access to a variety of services.

GM links ERP apps

General Motors Corp. said it has standardized on TSI International Software Ltd.'s Mercator software for integrating non-R/3 and legacy business applications into its worldwide SAP R/3 system. GM will employ Mercator to convert data and manage changes to more than 400 business systems.

Instant insurance

WeddingChannel, a Pasadena, Calif.-based online bridal registry and wedding planning resource, has signed an exclusive agreement with Intuit, Inc.'s Quicken InsuranceMarket service to provide online insurance services to newlywed couples. The site can be found at www.insuremarket.com.



Brigham and Women's Dr. Jonathan Schaffer says "baby steps" were key

Hospitals shave costs

► Web-based information exchange brings doctors, patients together

By Sharon Machlis
BOSTON

A GROUP of major Boston hospitals is achieving savings "in seven figures" from a wide-ranging information technology project designed to let hospital departments, doctors and patients share information.

The project includes a mas-

sive World Wide Web site — part public, part limited-access extranet — that offers information about doctors, medical procedures, treatment guidelines and participating hospitals.

But it hasn't been easy to get everyone to buy in.

"Convincing doctors to do something and retrain them... it's like herding cats," said Dr.

Jonathan Schaffer, associate director of the decision systems group at Brigham and Women's Hospital. "We have to make a few baby steps."

For example, while Brigham has had a robust E-mail system for years and doctors are accustomed to using it, doctors at other institutions still don't

Hospitals, page 30

Oil vendor wins with tiny IT staff

By Julia King
WALTHAM, MASS.

GLOBAL PETROLEUM CORP. has 400 employees, a string of gas stations, 25,000 home heating customers, annual revenue of \$2.5 billion — and an IT staff of five. Yep. Five.

Five people to handle all the day-to-day stuff, plus the conversion of more than 30 systems from the businesses Global has acquired — businesses that handle everything from jet fuel to home heating oil to the curve grease that lubricates the tracks of Boston's rapid transit system.

And now, Global is about to

jump into the convenience store business. "With little notice, we may enter a new aspect of the business, decide to sell a new product or enter a new pricing plan, so we forever have had to be light on our feet," said Jim Shelton, information technology director.

As the company has grown from a simple home heating oil supplier with 8,000 customers in 1973, its IT organization has remained small by design.

"We've come to the conclusion that it's simply more cost-efficient for us to outsource a lot of our expertise. But to do that, you correspondingly have to have people in-house who

can make good outsourcing decisions," said Tom McManmon, Global's chief financial officer.

That means Shelton may be

managing contractual relationships with a half-dozen vendors at any one time.

At Global right now, for example, consultants from Oracle Corp. are implementing new Oracle enterprise financial ap-

Vendor, page 30

"I've never liked people whose positions are so tunnel-vision that they have one function."
— Global Petroleum's Jim Shelton (second from right), with (left to right) Chris Matthews, Alan Wasserman and Tom Rizzo, all but one of Global Petroleum's IT staff.



Broker keeps containers from shipping empty

By Thomas Hoffman

CONSIDER THIS: The worldwide shipping industry spends \$20 billion per year to move empty containers from one port to another.

In other words, one in five containers in transit is filled mainly with fresh air, said Paul Crinks, a vice president at Greybox Logistics Services, Inc., a Purchase, N.Y.-based subsidiary

of Transamerica Corp., a financial services firm in San Francisco with revenue of \$5.73 billion last year.

Talk about underutilization. Seeing a market opportunity, Transamerica early last year launched a business service called Greybox to serve as an electronic stock exchange to match carriers that have extra containers with those lacking containers.

Tracking service, page 30



Airmax management package keeps vacant seats to minimum

By Laura DiDio


TWO NEW YIELD management and revenue management packages have helped Alaska Air Group, Inc.'s fleet of planes take off at or near capacity and at the same time keep overbooking to a minimum, leaving fewer customers grounded.

The result: up to a 10% drop in overbookings and an overall 1% to 2% return on investment in the past nine months.

The Alaska Group — comprising Alaska Airlines and Horizon Air — makes 1,000 flights each day, said Terry Alexander, manager of revenue systems.

Last November, the company abandoned its outmoded manual system to track open seats and discount them for rapid sale, and replaced it with the Sabre Decision Technologies, Inc.'s Airmax revenue manage-

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Tracking service

CONTINUED FROM PAGE 29

Under the service, which is supported by an Internet-based system called Tradexonline, a shipping company planning to move, say, 40 empty containers from Los Angeles to Hong Kong can check to see if other carriers want to "rent" those containers for that leg of the journey.

Greybox representatives then use a Microsoft Corp. SQL Server database to search for an appropriate match. Greybox charges \$50 for each container that changes hands, and the shipping companies save between \$250 and \$400 per container by having another company move it for them, Crinks said.

Tradexonline "helps us to track and utilize containers more effectively," said Loreto Medina, manager of container logistics operations at Compania Sur Americana de Vapores, a shipping company in Valparaiso, Chile, that has used the 'net service for two months.

Transamerica is facing stiff competition, as other transportation brokers "use the Internet to take advantage of soliciting freight," said Jeff Medford, a transportation analyst at William Blair & Co. LLC, a Chicago-based investment bank.

To ensure the authenticity of Tradexonline users and to determine which applications each customer was entitled to access, Transamerica Leasing — a Purchase, N.Y., subsidiary of Transamerica that built Tradex-

online — uses a software package called ECProfiler from EC Cubed, Inc. in Wilton, Conn.

Transamerica runs ECProfiler on its Tradexonline World Wide Web site to intercept customer messages, check the database to see what privileges that account has and influence the appearance of the Web site and the

buttons available for users to click on based on that user information.

To date, Transamerica has spent more than \$1 million to build the system, said George Reilly, director of business systems at Transamerica Leasing.

The service has been a hit: Greybox is interchanging 1,200 containers per month for 150 customers, and the interchange rate is growing 30% per month, Crinks said.

Still, less than 5% of the business Greybox is completing is

launched by customers over the Internet, which is a cheaper way to process orders than by phone.

Part of that stems from persuading customers to shift away from using the telephone to negotiate deals. Supporting telephone-based transactions "is very labor-intensive from our standpoint," Reilly said.

To combat the problem, Crinks and his team are evaluating incentive options, such as a frequent-usage program or Internet pricing models. □

Airmax user flying high

CONTINUED FROM PAGE 29

ment system and Tivoli Systems, Inc.'s Maestro automated job scheduling system. The two new systems let Alaska and Horizon better forecast trends and plan seating capacity, said Dan MacDonald, director of computer services. MacDonald, along with Rick Pikenon, oversees the Maestro system.

Alexander, who is their "customer," runs the Airmax yield management system that uses details of the daily reports furnished by Maestro to notify reservation agents to fill seats at newly assigned rates or auction off leftover seats on the company's World Wide Web site.

"The name of the game is to have our planes go out 100% full," MacDonald said. "Maestro lets us look at every flight and review bookings and capacity and establish trends."

Under the old system, some information, such as the nightly



Alaska Air Group's manager of revenue systems, Terry Alexander, uses Airmax to maximize reservations

data feed profiling airline reservations, equipment and scheduling, resided on mainframes. Other data resided on outmoded applications.

"We'd periodically screen scrape — manually build a file of the flight information and FTP it over the mainframe and combine it with other data," Pikenon said. Now, he says, "Every night we get an advanced booking file containing information on our flights up to 325 days in advance."

The prior system allowed only the managers to view flight departures, bookings and capacity levels 98 days in advance.

Now four yield-management analysts "point and click, and the new system finds open seats and the latest information instantly," Alexander said.

Maestro's and Airmax's combined abilities to better monitor trends and forecast peak and slow travel periods have yielded another dividend: They forecast optimal overbooking levels to assure the fullest flights and minimize overbooking.

"In one market segment alone, we've reduced our denied boardings by 10% in a given month. We're getting more people on flights," Alexander said. □

Hospitals

CONTINUED FROM PAGE 29

want their E-mail addresses made public. The project team looked for support from what it called the "five Cs" — CEOs, chief operating officers, chief financial officers, chief information officers and chief medical officers — to gain acceptance.

PartnerWeb ties together medical centers and doctors who are part of an organization called Partners Health Care System, Inc., which oversees the affiliation among many doctors and hospitals, including Brigham and Women's and Massachusetts General Hospital. Work on it was begun in May 1995, and it has been online about a year and a half.

There was a lot of integration to be done — not only among the institutions, but also within departments themselves. Schaffer told the Business World conference in Boston two weeks ago. In one case, he said, information on orthopedic patients was being entered 12 times into various databases.

Parts of the 25,000-node network offer the public Web access to medical information and research and the ability to request appointments online. Other information is just for Partners Network members, including guidelines for doctors who refer patients for admission. Patient records aren't on the network. Schaffer, a practicing orthopedic surgeon, said he has had patients come into his office with printouts of his biography from his Web page.

The health care industry has been comparatively slow to adopt Internet technology in part because of security, privacy and regulatory concerns, said Erica Rugulies, an analyst at Giga Information Group in Cambridge, Mass.

And with a multitude of standards, setting up electronic transactions can be difficult. But institutions that have moved to systems such as IP-based electronic data interchange are seeing significant savings, she said.

PartnerWeb has seen big savings from relatively simple things, such as posting thousands of pages of research on the Web instead of printing them out, Schaffer said. Other features, such as explanations of medical procedures, have been helpful to patients. "Now we are seeing a mandate from the CEO of the hospital" for doctors to beef up the content on their pages, he said. □

Vendor keeps staff lean

CONTINUED FROM PAGE 29

plications. A different systems integrator is migrating a proprietary, Unix-based system for tracking oil futures transactions to a new Windows NT platform. Global also has outsourced management of its wide-area network to Unisys Corp. Managing outsourcers is a major challenge for many internal IT organizations, which often have problems getting the service they pay for, said Pete Pijawka, a principal at Align, Inc., an outsourcing consultancy in Wayne, Pa.

"They've grown up in internal IT organizations that have been delivering services and prod-

ucts, so it's difficult [for them] to behave like a customer and demand things of the outsourcer," Pijawka said.

But in years of operating lean and mean, outsourcing most of what he can't do in-house, Shelton said he has developed a very good feel for choosing the right service providers and making the relationships work well for Global.

But precisely how he chooses service partners is difficult to put into words; he relies on a gut feeling, he said.

At Unisys Corp., for example, Shelton was once waiting for Chairman Larry Weinrach to

join him at a meeting with other Unisys users. Weinrach was late and entered the room just as lunch was being wheeled in. But the caterer had trouble getting her cart over the door jamb. Without pausing, Weinrach tucked his folder of papers under one arm, lifted the cart, into the room, then started the meeting.

Shelton's gut feeling said that this was a vendor who could get things done. But you can't outsource everything, which means Shelton and the other four Global IT employees have to juggle multiple tasks and master many technologies.

Chris Matthews is the archetypal Global Petroleum IT employee. Hired two years ago as a computer operator, Matthews does the usual tape-mounting

and backup work. He also troubleshoots desktop problems for 200 users in Waltham and oversees the company's NetWare from Novell, Inc. and Windows NT networks.

"For me it's wonderful because it offers the opportunity to constantly learn new things. That's what I like about wearing a lot of different hats," Matthews said.


And though Shelton is chief IT strategist, his desk is still a jumbled collection of wrenches, nut-drivers and power cords nestled among Oracle7 server and Oracle7 applications diskettes.

"I've never liked people whose positions are so tunnel-vision that they have one function," Shelton said. "That would drive me crazy." □

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Internet Commerce

Extranets • The World Wide Web • Intranets

Briefs

New firewall options

WatchGuard Technologies, Inc. is shipping Firebox II, a \$4,995 package that offers firewall protection and authentication for offices, encryption for all communications with WatchGuard's virtual private network and remote centralized management for a network of Fireboxes.

And Axent Technologies, Inc. has released a free software update for its Raptor Firewall 5.0 software that secures Microsoft Corp. Outlook 98 and Outlook Express 4.x desktops from Internet-based hacks against desktop clients. It can be downloaded from www.axent.com.

Nontechnical intranets

Trellix Corp. has updated its Trellix Web content creation software, designed to aid intranet development. The \$249 Trellix 2.0 adds the ability to create Hypertext Markup Language, handle tables and embed documents from OLE-compliant applications such as Microsoft Corp.'s Word and Lotus Development Corp.'s 1-2-3. It also can pull those documents and automate page creation when a user drags a file or uniform resource locator onto the Trellix site map.

Top 10 fastest-growing Web sites for the first half of 1998

URL	GROWTH RATE
www.angelfire.com	5.9%
www.xoom.com	4.8%
www.preferences.com	4.4%
www.theglobe.com	4.2%
www.hotmail.com	4.1%
www.excite.com	4.1%
www.tripod.com	3.6%
www.geocities.com	3.3%
www.icq.com	2.8%
www.bonzi.com	2.7%

Base: 11,000 Internet users



Seafax has cast its line on the 'net' to match up seafood buyers and sellers

Seafood buyers, sellers cast 'net'

By Sharon Machlis

THE INTERNET is letting Seafax, Inc. fish around for a new line of business.

The Portland, Maine, company's main service has been providing credit reports to companies in the meat, poultry and seafood industries. But with the advent of the World Wide Web, Seafax has launched a project aimed at matching up seafood buyers and sellers.

"[Seafood] is the last food that's hunted," said Seafax CEO Neal Workman. Therefore, supplies can vary widely from week to week depending on fishermen's hauls. "And it's an extremely fragmented business," he added. "There's no Frank Perdue of fish."

If you've ever wondered how haddock gets to your supermarket, a lot of low-tech searching typically goes on. A fish whole-

saler with haddock to sell might fax the information to dozens of potential purchasers, hoping to find a company that needs it. A restaurant or grocery store chain that needs more haddock, meanwhile, could be making dozens of phone calls looking for someone who has it.

Enter GoFish. The new Web site (www.seafax.com/gofish), developed for Seafax by Extraprise Group in Boston, lets sellers post available products and buyers post what they're seeking. The database informs users if there are already any matches

Seafood, page 34

Chat client speeds up trade info

By Roberta Fusaro

When the Dow is volatile, futures traders need speed.

Which is why Christopher McGinnis, a commodities trading adviser and president of New York-based FutureSignals, is glad he switched four months ago from fax to Internet-based chat software to signal clients about market changes.

FutureSignals evaluates the Standard & Poor's 500 and Nasdaq 100 futures markets and sends that signal information to day and position traders via AbbottChat software from Abbott Systems, Inc. in Pleasantville, N.Y.

McGinnis has been in the futures trading market for four years and has issued FutureSignals for five years via fax. "But I found that the fax machine just took too long," he said.

"Time is of the essence," McGinnis said, especially when the market fluctuates

Chat client, page 34

Resellers are new Web trainees

► Companies tap 'net for product training

By Barb Cole-Gomolski

WEB-BASED training has been slow to take off as a replacement for corporate classroom training. However, Web-based systems are gaining ground with companies that need to educate their channel partners.

Companies that offer training programs via the World Wide Web or their corporate intranets are still in the minority. According to the American Society for Training & Development in Arlington, Va., less than 10% of companies are doing this — in part at least, because it takes time for companies to build the secure systems that support such applications.

But Web-based training systems are catching on as a way to distribute new product information and host collaborative sessions with resellers and dis-

U.S. corporate spending forecast for Web-based training*



Source: International Data Corp., Framingham, Mass.

tributors, enabling companies to trim travel budgets and reach a wider audience.

"We didn't have enough seats available in the classroom or enough instructors to train everybody," said Rob Donald, senior technical trainer at Mitel Corp., an Ottawa-based maker

of telephone switches.

In the past, the company would invite resellers to its facility to learn about new products in a traditional classroom setting. A lack of space in the classroom wasn't the only issue. Reseller companies found it difficult to free up a technician for a two-week class, Donald said.

Today, Mitel's distributors can receive paper-based course materials and then participate in Web-based discussions using Symposium from Centra Software, Inc. in Lexington, Mass. The software has the ability to handle remote demonstrations and can be accessed using a Web browser.

Tricia Reardon, technology training supervisor at Advest, Inc., a Hartford, Conn.-based brokerage firm, uses Symposium to educate about 500 brokers in 90 offices about new products that the company plans to offer. "We used to trav-

Resellers, page 34

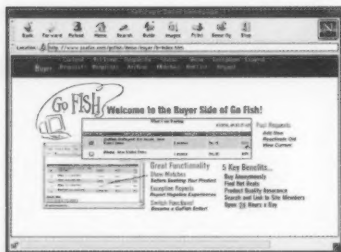
Seafood buyers, sellers cast 'net'

CONTINUED FROM PAGE 33

posted on the system. Users can also check the credit reports on a buyer and the quality ratings of a seller.

More than 350 companies have signed on to test the system, including major grocery and restaurant chains such as Red Lobster. Some postings can initially be done anonymously, so prices don't rise if people learn, for example, that Red Lobster is suddenly in the market for a lot of shrimp.

"We have been able to find fish that would have probably taken as many as a hundred phone calls to find," said Mark Soderstrom, president of South Stream Seafoods, Inc., a Warwick, R.I., fish wholesaler and importer. "It's a huge time-saver."



Seafax's GoFish site lets sellers post products and buyers post what they're seeking

The actual transaction takes place the old-fashioned way. Parties fax or E-mail price lists and often haggle over the final price on the telephone. "That's part of what I like," Soderstrom said. "I like to talk to people when we do the deals."

In July, GoFish launched a

trial phase that is expected to wrap up next month. For now, use of the system is free. Beginning next month, annual subscriptions will be available at prices ranging from \$5,000 to \$7,500. Although he didn't discuss specific figures, Workman said he expects the system will show a profit by next year.

The technology behind the site was pretty straightforward. Workman said creating the site primarily involved developing a database of inventory and a Web front end to access it. The main glitches so far have to do with browser compatibility. GoFish was designed to take maximum advantage of capabilities in Microsoft Corp.'s Internet Explorer 4.0. It isn't working well with America Online, Inc.'s interface, Workman said.

Gary Pizzuti, seafood purchasing manager at Publix Super Markets, Inc. in Lakeland, Fla., said he isn't able to properly post to the site using an older version of Explorer and has to make his postings by telephone to Seafax.

"I'm pretty happy with [the fish] I've gotten," Pizzuti said. "But if I can't get [Internet Explorer] 4.0 from my company, I'm not going to sign on." His company has strict rules about what software it allows users to install on corporate desktops.

The site is part of a growing

trend to create virtual marketplaces for various industries on the Web.

Last month, for example, two of the nation's largest steel companies announced MetalExchange for buying and selling various metals as well as disseminating industry news and

"It's an extremely fragmented business. There's no Frank Perdue of fish."

- Neal Workman, Seafax CEO

hosting communications areas [CW, Aug. 24]. Another such site for the battery industry is in the works, and there are other ventures targeting utilities and commodities trading.

NEXT WAVE

"It's the third wave" of business-to-business electronic commerce, after sites posted by sellers and then those created by purchasing communities, said Erica Rugulies, an analyst at Giga Information Group in Cambridge, Mass.

For the time being, Workman said, Seafax will generate revenue from the site the same way it does from its credit business — through annual subscriptions.

Someday, though, he said, he believes Web middlemen might also be able to get small transaction fees. "This," he said, "will make our core business look like a fly on an elephant's bottom." □

turn into a big party: "Half the group will stay out all night and be sleep-deprived the next day," Richardson said.

COLLABORATIVE

Other options, such as conference calls, fail to provide the level of collaboration companies are seeking. For example, when Octel rolled out a product to its channel partners, it would typically fax information to about 75 resellers and then get everybody on a conference call.

"The first 20 minutes of every conference call involved making sure everybody got the fax and resending the information to the people who didn't," Butz said. □

Chat client speeds up trade info

CONTINUED FROM PAGE 33

as dramatically as it did two weeks ago. "I needed to get all our [thousands of] subscribers out of a position immediately."

With AbbottChat, McGinnis sends an instant page to clients regarding market changes. They receive the information within about 12 seconds and can buy or sell stocks based on that information. Faxing that information to clients took up to three minutes per transmission. By that time, McGinnis said, his clients had already lost money.

McGinnis said he averages about 30 AbbottChat messages per day on the system for all his clients. Transmission costs are zero, he said.

AbbottChat real-time messaging software was released in May. It is typically downloaded free from the Internet, but Abbott Systems offers customized, customer-service robots and other chat-based programs for a fee. Abbott Systems also sells advertisements, which appear in a message window.

SECURE CHAT

Tim Bajarin, president of Creative Networks, Inc., a research firm in Campbell, Calif., said AbbottChat is different from competitors such as Mirabilis, Inc.'s ICQ, America Online's AOL Instant Messenger and ActiveWorld, Inc.'s Ding in that it provides "secure, point-to-point chat."

The others use a global network model, he said. AbbottChat doesn't relay messages through a server, so it is better for setting up private communications within a company. Access is restricted, Bajarin said. According to Abbott Systems, users can access other users only if they know the identification number — along the lines of public phone lines without the party-line feature.

Businesses typically don't rely on chat software for mission-critical functions across a company, Bajarin said, but the AbbottChat model could help change that within the next few years.

Bob Cox, president and CEO of office-support provider Mobile Word in New Rochelle, N.Y., said he uses AbbottChat as a primary means of quick, two-way contact management between staffers in far-flung offices.

Cox's company offers services such as data entry, text translation and voice-to-text conversion

and transcription, accessible over the Internet. It has nine full-time employees in the New Rochelle office and more than 150 operators and support staff at offices in Ireland, San Diego, Portland, Ore., and Long Island, N.Y.

Cox said he keeps the AbbottChat window up and running on his system so people can get in touch with him quickly. "I see it as the equivalent of sticking your head into the office to ask a quick question. For a decentralized group like Mobile Word, it's perfect," he said.

He said the Internet-based program is efficient for holding meetings; the team has to simply click on an icon to call someone in.

Cox said for more substantive conversations, staffers jump on the phones or into a conference room, "but let's just say [AbbottChat] is one alternative." "And the quick communication can move projects along faster, so costly delays are avoided." □

Beyond PCs

Microsoft Corp. Chairman and CEO Bill Gates sees a future when smart phones, intelligent wristwatches and World Wide Web-enabled televisions will outsell PCs, and he said Microsoft will make sure a version of Windows runs on all those devices.

"A lot of people have a very narrow definition of a PC," Gates said, speaking at the IDC Forum held in Paris last week.

But no single platform is standard for the wide range of devices poised to enter the market, so Microsoft will have to prove that the operating systems it develops are better than competitors' offerings, said Frank Gens, senior vice president of Internet research at International Data Corp. in Framingham, Mass., a sister company of Computerworld.

Although just 4% of those accessing the Internet this year use non-PC devices, Gens said he expects that number to skyrocket to 43% by 2002.

— Kristi Essick

Essick writes for the IDC News Service in Paris.

Resellers get Web-trained

CONTINUED FROM PAGE 33

el to each branch office and give a presentation," Reardon said.

Although Web-based systems are proving to be useful and cost effective when training channel partners, there are pitfalls to the approach.

"You can't really hold someone's attention for more than half a day" if they are participating in a Web-based seminar, said Jim Butz, a senior manager at the Octel messaging division of Lucent Technologies, Inc.

Butz uses Denver-based Broadband Associates' M.Show service to brief channel partners

about new products. The service costs about \$1 per minute per participant; Butz limits his Web-based presentations to three hours or less.

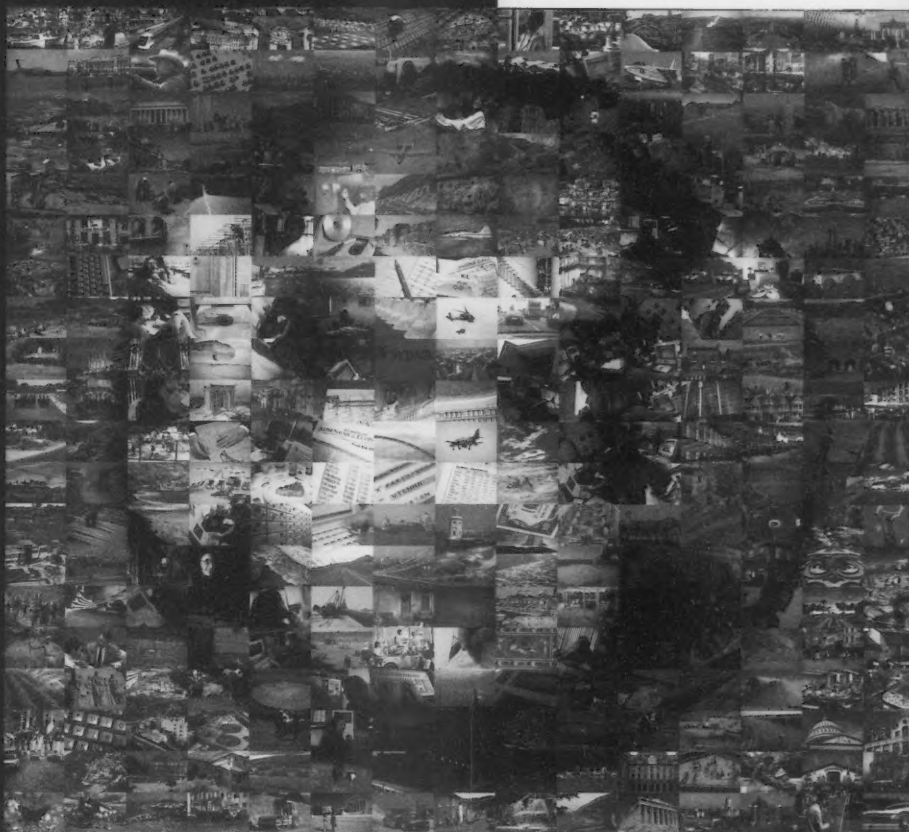
Bruce Richardson, vice president of research strategy at AMR Research, Inc. in Boston, said Web-based training systems are still one of the best ways to manage product launches or engineering recalls.

"This is a cost-effective way to communicate a change about your product," Richardson said. In addition, when you have to train resellers in person, it can

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NEW PRODUCTS

CYBERMEDIA, INC. has announced Guard Dog 2.0, privacy software for users connected to the Internet.

According to the Santa Monica, Calif., company, the software controls cookies and other technologies that third parties use to track online behavior. It was designed to prevent transmission of personal information over nonsecure con-

nections or through bogus applications.

Guard Dog 2.0 costs \$59.95.

CyberMedia
(310) 664-5000
www.cybermedia.com

INNO CORP. has announced DynaBase 3.0, World Wide Web publishing and content management software for large news,

technical or financial publishers.

According to the Boston-based company, the software now supports Extensible Markup Language, the successor to Hypertext Markup Language. New workflow capabilities can automate the process of authoring, editing and publication approval. The software plugs in to Microsoft Corp.'s Internet Information

Server or Netscape Communication Corp. servers running Windows NT 4.0 or Solaris 2.6.

Pricing starts at \$47,000.

Inso
(617) 753-6500
www.inso.com

FRESHWATER SOFTWARE, INC. has announced Global SiteSeer, a service that monitors World Wide Web sites to check performance and availability.

According to the Boulder, Colo., company, when local or global access problems are detected, the service notifies site administrators via pager or E-mail. Using a browser, site administrators can access information about the visibility of their site to customers, Web-page access, download times and 10 different management reports.

An annual subscription starts at \$3,495.

Freshwater Software
(303) 443-2266
www.freshtech.com

BRIGHT TIGER TECHNOLOGIES has announced ClusterCats Turbo, application load-balancing software for improved Web site speed and reliability.

According to the Acton, Mass., company, the software works on a single World Wide Web site comprising two servers. It manages performance for Microsoft Corp. Active Server Pages and Common Gateway Interface or Hypertext Markup Language page applications. It holds each user session to the same server to preserve application performance and transaction success.

It costs \$795 for two servers.

Bright Tiger Technologies
(978) 263-5455
www.brighttiger.com

ARRIBA SOFT CORP. has announced Arriba Express, a file management and viewing tool that helps users manage World Wide Web data types.

According to the Emeryville, Calif., company, the software recognizes more than 400 file types, including image, text, video and audio files. It also provides native authoring tool support, search capabilities, project organization and a Windows-based interface.

Arriba Express costs \$149 per user.

Arriba Soft
(630) 904-7150
www.arribasoft.com

SEPTEMBER 28, 1998

GLOBAL INNOVATORS SERIES

WHEN GIANTS COLLIDE

Like opposite poles of a magnet, multinationals are finding the urge to merge almost unavoidable.

In recent months companies like Daimler Benz and Chrysler agreed to join forces. Bertelsmann anted up \$1.4 billion for Random House, and Seagram Co. shared PolyGram Records for nearly \$11 billion. Such meldings are symptomatic of an evolving global economy in which multinationals search worldwide for greater economies of scale and marketshare, meaningful product and customer extensions and — of course — ever-elevating shareholder value.

Sounds grand, but it's easier said than done. Achieving such synergies — or making the disparate pieces fit — is highly dependent on well-oiled information technologies. And the earlier IT strategists are involved in the process, the better. Learn how some are succeeding — while others are falling short — in our Global Innovators supplement in the September 28th issue of Computerworld.



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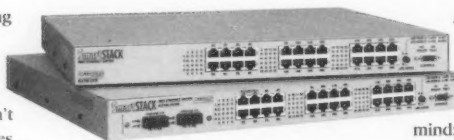
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Briefs

Projected percentage of IP-based voice traffic at Fortune 1,000 companies

	Less than 1%
1998	
2002	18%
2005	33%

Base: 30 Fortune 1,000 telecommunications and data communications managers in the retail, manufacturing and insurance industries

Source: Kilen & Associates, Palo Alto, Calif.

Superfast Token Ring

Olicom, Inc. has announced availability of two products designed to provide added speed to Token Ring installations: a 100M bit/sec. adapter card for file servers and a two-port 100M bit/sec. uplink for its CrossFire 8600 Token Ring switch. Most Token Ring LANs run at 4M or 16M bit/sec. The adapter costs \$350, and the uplink costs \$1,100.

Unicenter stand-alone

Computer Associates International, Inc. last week released four stand-alone software products that have all the capabilities of CA's Unicenter TNG system at prices ranging from \$6,495 to \$10,495. The products for the enterprise include: ShipIT, a \$2,000 automated software distribution package; AimIT, an asset and inventory management program priced at \$2,000; and NetworkIT, a \$995 network management program.

Managing bandwidth

Packeteer, Inc. has announced software that enables its PacketShaper bandwidth management devices to discover traffic, monitor performance, control capacity and enforce service-level agreements for users of Citrix Systems, Inc.'s WinFrame and MetaFrame thin-client servers. The software, dubbed Thinurance, will be available as a standard feature with all PacketShapers shipped starting this month, with free upgrades available to existing PacketShaper users.

In nets, price isn't everything

► Managers rank it below other decision items

By Bob Wallace

THE RAPID PACE of technology development and increasing competition continue to force networking vendors to reduce prices to retain business.

But many network managers say price cuts don't affect their network plans — not much anyway.

In making networking decisions, cost cuts matter less than the power of the technology, vendor support, network management features, training and maintenance, users say.

"We focus on the total cost of ownership of projects because there's the cost of training and network management to consider," said Alan Robson, director of network systems at coupon giant Cox Target Media, Inc. in Largo, Fla. "Price is always a factor, but technology and product capabilities are first and foremost with us."

Support and long product life cycles are paramount to Steve Lopez.

Even price cuts of 30% are "marginal," said Lopez, network manager at The National Board of Medical Examiners in Philadelphia.

"When we're planning a network, the price-per-port cost of products is not nearly as impor-

tant as the vendor's ability to support the hardware and the performance of the equipment," he said. "We're more interested in the vendor's ability to upgrade a product to keep it alive [over time]."

And most users won't change vendors just for a price break, either, Lopez said. "Users are

not going to rip out their network infrastructure for economic gain. There has to be a very radical change in technology that they can't get from their [current] supplier," he said.

CardService International, Inc. in Agoura Hills, Calif., is considering a move from a Fiber Distributed Data Interface backbone network to one based on Gigabit Ethernet, mainly to add high-speed routing switches to the network, according to Sean Gilbert, manager of infor-

Price, page 40

"Price is always a factor, but technology and product capabilities are first and foremost with us," says Alan Robson at Cox Target Media



OPERATING SYSTEMS

NT 4.0 deal would line up users for 5.0

By Sharon Gaudin

IN A BID to line up Windows NT 5.0 users possibly a year before the system ships, Microsoft Corp. is cutting users a deal in a stepped-up effort to get corporate information technology managers to trade up to NT Workstation from Windows 3.1, 95 and the just-shipped 98.

Bill Peterson, an analyst at International Data Corp., a Computerworld sister company in Framingham, Mass., said Microsoft is hot to work NT into the enterprise. And that may not happen as quickly as the company would like if users are waiting for NT 5.0 to come out

NT 4.0 deal, page 40

HR getting dedicated call centers

By Matt Hamblen

OVER THE PAST YEAR, many large companies have given their call centers the additional task of fielding calls from employees with questions about their job benefits, 401(k) investments and other personnel matters.

But there's a new wrinkle: Pioneering companies have created call centers devoted solely to human resources, staffed with people specifically trained to handle employee queries.

Sears, Roebuck and Co. has built a dedicated human resources call center to serve the investment and ongoing benefit needs of 300,000 former and

current employees, for example, and Lockheed Martin Corp. in Bethesda, Md., is about to launch a benefits center for thousands of its workers.

"It's been a work-in-process to have our HR functions centralized, but it's worked out well and has certainly cut costs," said Sam Goodson, integration manager at Hoffman Estates, Ill.-based Sears. "We used to have 20 payroll centers and maybe 20 different HR centers, and now there's just one, in Tucker, Ga."

Goodson wouldn't discuss the amount of the savings but said a study of the project's return on investment is under way.

All told, the Tucker center

supports 2,500 stores nationwide and up to 300,000 workers and former workers who need information, Goodson said.

Large companies are establishing dedicated human resources call centers because they can put all personnel data in one place and connect it to a central pool of trained call-center agents, analysts said. That dramatically reduces the time human resources personnel spend on phone calls, ensures that the information given out is consistent and accurate and avoids the need to have human resources staff located in every branch office.

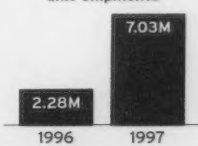
"It creates a consistency and a single point of contact for employees to call or contact over the Web," said Jim Halincheck,

Call centers, page 40

NT INCENTIVES

Microsoft is offering special upgrade deals on Windows NT Workstation but not because sales are lagging:

Windows NT Workstation unit shipments



Source: Microsoft Corp., Redmond, Wash.

NT 4.0 deal would boost NT 5.0

CONTINUED FROM PAGE 39

before migrating. If NT 5.0 doesn't ship until next year and users wait even longer for several option packs, it could be 2000 or 2001 before they make the move.

But Microsoft wants users to move faster than that, Peterson said. That's why it is offering a program that doesn't save users money on new NT 4.0 installs but promises discounts on eventual migrations to 5.0, he said.

Nonetheless, some corporate users wonder whether migrating to NT Workstation 4.0 will make it easier or just more painful to move to NT 5.0 when it ships. Microsoft has given no official ship date for NT 5.0, but most industry watchers expect it next year.

"It all would depend on how difficult the migration is," said Bob Frase, director of information systems at United Paperworkers International Union in Nashville. "If I have to go out and retrain everybody for NT 4.0 and then NT 5.0, I wouldn't want to do that. We're going to wait for NT 5.0. I'm not sure my users could handle much more change."

Microsoft isn't so much offering a sale as it is offering a cheaper upgrade to NT 5.0, according to Craig Beilinson, Microsoft's product manager for Windows NT Workstation.

He said that Microsoft simply is trying to make it cost-effective for customers to move to NT over the long term. Microsoft's position is that Windows 98 is a consumer operating system and not meant to be an upgrade

"If I have to go out and retrain everybody for NT 4.0 and then NT 5.0, I wouldn't want to do that. I'm not sure my users could handle much more change."

**- Bob Frase,
United Paperworkers International**

from Windows 95 or Windows 3.1 for businesses, he said.

Beilinson said that for \$276, a user gets a license with the option for a free upgrade to NT 5.0 over the next two years. That \$276 fee is \$38 more than what a basic NT 4.0 license costs.

Industry watchers estimate that an NT 5.0 license alone will probably cost users between \$230 and \$300. A user has to buy at least five copies of NT 4.0 to qualify for the program.

Peterson said the price change isn't likely to be related to problems with NT Workstation sales. He said those sales increased by 208.5% last year from the year before.

"No, they're not hurting at all," Peterson said. "This just shows how much Microsoft wants corporate desktops to be NT. If you migrate to NT 4.0, you have two years conceivably to move to NT 5.0. If you don't mind migrating twice, that's a sweet deal."

But how many users will want to make a migration twice in such a short time?

For Brian Brumit, director of business systems advisory services at Coopers & Lybrand LLP in Princeton, N.J., the special licensing deal poses some interesting questions.

Brumit said he had planned to move from Windows 95 to NT Workstation when NT 5.0

comes out, but now he is considering making the move early.

"It makes a much more compelling case to start in on NT 4.0," Brumit said. "It hedges our bets and locks them in to a 5.0 migration path. It further entrenches corporations into a Microsoft future." □

Price

CONTINUED FROM PAGE 39

mation systems. Top considerations include performance, reliability, vendor experience and product scalability.

Sales do climb as prices drop, but some users upgrade to new technologies because they need more bandwidth or advanced features to streamline network operation, not because prices are falling, said Tam Dell'Oro, president of Dell'Oro Group, a Portola Valley, Calif., research firm. "If I don't need to migrate and am happy with what I have, I don't care how cheap the next option is," she said.

Nevertheless, per-port prices for switched and Fast Ethernet systems will continue to drop, according to Dell'Oro Group.

For example, a switched 10M bit/sec. Ethernet port that cost \$211 last year and sells for an average of \$113 this year will sell for \$86 next year and \$73 in 2000, Dell'Oro predicts. And a 100M bit/sec. Fast Ethernet port that lists at an average \$197 this year will plunge to \$128 next year and \$95 in 2000. Those figures include price cuts and the debut of systems that sell at a lower cost per port. □

SHORTS

Internal encryption

Network Associates, Inc. in Santa Clara, Calif., has begun shipping its PGP Enterprise Security 3.0 package, which lets managers secure traffic within their networks using 128-bit key encryption. The product combines E-mail and file security with centralized server and management tools. It integrates with E-mail clients, including Microsoft Corp.'s Outlook '98 and Novell, Inc.'s GroupWise. A single client license costs \$84, and volume licenses for 1,000 seats or more are \$26 per seat.

Encrypting E-mail

Messaging server maker Infinite Technologies in Owings Mills, Md., last week introduced an add-on security module for its WebMail and InterChange mail server software. The module is based on technology from RSA Data Security, Inc. in San Mateo, Calif. It supports Secure Sockets Layer technology so users can encrypt information sent over the Internet and prevent unauthorized users from intercepting and reading E-mail as it travels from point to point. Pricing information was not available.

'net-based collaboration

Innovative Software, Inc. in San Francisco last week announced TeamCenter, a collaborative team management system. It lets distributed teams and team members at a company coordinate their projects over the Internet. It lets team members and project managers view schedules, tasks, notes, reports and goals in real time. It is built on an enhanced three-tier SQL database model that allows for simultaneous access to information by users. It will ship this month. The TeamCenter client costs \$95 per user. Server pricing begins at \$675.

Document sharing from 2Bridge

San Francisco-based 2Bridge Software, Inc. recently announced 2Share 2.0, a browser-based software package that lets users share corporate information by posting it and viewing it through a customizable two-way portal. Text, audio and video files and illustrations posted to the corporate intranet are dynamically and automatically updated. 2Share 2.0 offers one-button World Wide Web publishing, personalized views and seamless access to information via Extensible Markup Language. It is available immediately. Pricing starts at \$45,000.

Lucent's unified in-box

Third-party developers were out in full force at last week's Microsoft Exchange conference in Boston, hoping to leverage the rising sales of messaging servers. Among them was Lucent Technologies, Inc., which demonstrated its Octel Unified Messenger for Exchange, a system that lets Exchange users collect voice, fax and E-mail messages in a single in-box.

PalmPilot goes cellular

Mitsubishi Wireless Communications, Inc. last week launched the PalmPilotConnection Kit, which enables wireless communications for 3Com, Inc.'s PalmPilot via a Mitsubishi Mobile-Access 100 cellular smart phone. The \$110 kit will be available later this month through carriers such as AT&T Wireless, GTE Wireless and Bell Atlantic Mobile.

Exchange add-on gets upgrade

Ottawa-based MessageWise, Inc. last week introduced an upgrade to its Messaging Manager's Assistant (2MA) for Microsoft Corp.'s Exchange messaging server. Version 2.0 of 2MA features a new graphical user interface, expanded event and service monitoring and fully customizable reporting options. It costs \$995 per server. It requires Windows NT and will run on Intel- or Digital Alpha-based workstations.

Call centers

CONTINUED FROM PAGE 39

an analyst at Giga Information Group in Chicago.

At Sears, one of the biggest benefits has been the ability to cut down on the duplication of work if an employee calls several times, Goodson said.

Agents put notes on each call into a database, so that the next time the employee calls, those notes are instantly available.

Another advantage of a centralized human resources help desk is that employees have one point of contact.

For example, Halincheck said he knows of a large package-delivery firm that has 50 numbers for employees to call. It wants to reduce those to one.

But Goodson warned that companies interested in setting up human resources call cen-

ters should be prepared to spend considerable amounts of time and money on training agents to handle human resources matters.

"Technology doesn't solve it all," he said.

Sears worked with Quintus Corp. in Fremont, Calif., to create a database and Internet Protocol front end to give agents access to employee records. Quintus used its experience with Sears and other companies to develop a commercial package of software and services for setting up human resources call centers. The resulting product, called HRQ, is available for \$50,000 per server plus \$2,000 per user.

There are numerous vendors in the call-center market, but Quintus is the first to offer a specialized product for human resources applications, Halincheck said. □



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NEW PRODUCTS

ACTIONTEC ELECTRONICS, INC. has announced DataLink V.90/K56flex, a fax/modem PC Card for mobile users running DOS, Windows 3.x/95/98 or Windows NT.

According to the Sunnyvale, Calif., company, the phone-ready modem was designed for 56K bit/sec. Internet connections. It supports both the K56flex

standard and the recently ratified V.90 standard.

Software for fax and data communications is included.

In the fax mode, the modem offers send/receive fax speeds up to 14.4K bit/sec.

DataLink V.90/K56flex costs \$149.

ActionTec Electronics

(408) 752-7700

www.actiontec.com

CHASE RESEARCH, INC. has announced the PCI-RAS4, a Peripheral Component Interconnect (PCI) card that adds 56K bit/sec. modem capabilities to NT servers.

According to the Nashville company,

one card enables users to install four dial-up modem channels on a server for applications such as remote access, Internet and messaging.

The host interface is a 32-bit PCI bus. It supports plug-and-play compliance for up to eight cards per server.

PCI-RAS4 costs \$1,195.

Chase Research
(615) 872-0770
www.chaser.com

MTI TECHNOLOGY CORP. has announced the Gladiator Fibre Channel Multiplexer, a Fibre Channel-to-SCSI router.

According to the Anaheim, Calif., company, the router lets users attach SCSI-based MTI Gladiator RAID storage arrays to Fibre Channel host systems running Hewlett-Packard Co.'s HP-UX.

Two 100M byte/sec. Fibre Channel connections allow redundant loop attachment, and four UltraSCSI ports provide connection to the redundant, auto-failover RAID controllers in MTI arrays.

The product costs \$47,570.

MTI Technology
(714) 970-0300
www.mti.com

FOUNDRY NETWORKS, INC. has announced a 24-port version of its ServerIron server load-balancing and caching switch.

According to the Sunnyvale, Calif., company, the switch was designed for Internet service providers and large companies.

It offers hardware-based load balancing and 10/100M bit/sec. throughput on each port.

The switch costs \$18,995.

Foundry Networks
(408) 731-3800
www.foundrynet.com

D-LINK SYSTEMS, INC. has announced DSH-16, a 16-port Ethernet/Fast Ethernet hub for small offices and workgroups.

According to the Irvine, Calif., company, the hub has 10/100M byte/sec. auto-negotiation on each port and a built-in segment switch.

The segment switch enables the independent Ethernet and Fast Ethernet network segments to talk to each other without an additional switch.

The DSH-16 costs \$399.

D-Link Systems
(949) 788-0805
www.dlink.com

SEPTEMBER 21, 1998

Intranets Series INFRASTRUCTURE: Battling Bottlenecks Buying Bandwidth

Bandwidth hungry intranet applications are straining company infrastructures, and rapid application development is making it hard for network managers to keep up with the demand. Attempting to unclog the bottlenecks, most network managers widen the pipes by throwing more bandwidth at the network. For some this is accomplished with Gigabit Ethernet; others are using ATM to beef up the network. Companies say caching and load-balancing alleviate some of the strain, but these are not long-term solutions. And companies need long term solutions. This problem is only going to get worse.

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Software

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Briefs

CA takes Notes

Computer Associates International, Inc. recently acquired Agoura Hills, Calif.-based Qxcom, Inc., a developer of tools for Lotus Notes and Domino systems administrators and a longtime Lotus Development Corp. business partner, for an undisclosed amount. The acquisition gives CA's Unicenter TNG a Notes/Domino option — an add-on that lets administrators monitor Notes servers.

Utilities in sight

Documentum, Inc. last week said it will offer utilities customers consulting services and an enhanced version of its Enterprise Document Management System 98 that features applications tailored for the utilities industry.

R/3 gets some support

SAP AG has teamed with Microsoft Corp. and IBM in separate moves that expand the interoperability programmers will have with R/3. Developers working with Microsoft's Visual Studio 6.0 tools will be able to integrate their applications with SAP's business framework. Meanwhile, SAP and IBM announced that IBM's VisualAge for Java fully supports SAP's business application programming interfaces (BAPI). BAPIs also will be accessible through the IBM Component Broker middleware later this year.

JAVA

Pros

- Easier to use than C/C++ and almost as powerful
- Java applets make it easy to create interactive content
- Highly portable

Cons

- Immature technology
- Not practical for Windows 3.1
- Necessary tools cost extra

Source: Ciga Information Group, Cambridge, Mass.

Keeping supply under control

► Demand rises for tools that ease bottlenecks

By Nancy Dillon

MORE THAN 16,000 times last year, vendors supplying goods to Service Merchandise Co.

requested shipments be picked up. Every request was processed by hand.

Now, the process is fully automated, thanks to a private extranet paired with routing optimization software.

"We only intervene now when an exception occurs, like when a vendor tries to ship something too early," said Bill

Simms, senior systems project coordinator at the Brentwood, Tenn.-based national retailer.

The system kicks in when a supplier accesses Service Merchandise's Internet site to alert that an order is ready for pickup. Decision optimization software, called TransPro from CAPS Logistics, Inc., then batches the order with complementary orders to create full truckloads. Requests for transportation go out to third-party carriers, such as

Supply, page 46

SUPPLY-CHAIN AUTOMATION



Pepsi-Cola General Bottlers' Pete Venegas: "If you try to rely on [CAPS's Supply Chain Designer] for certainty, it will paralyze you with millions of questions"

Data tools simplify Web publishing

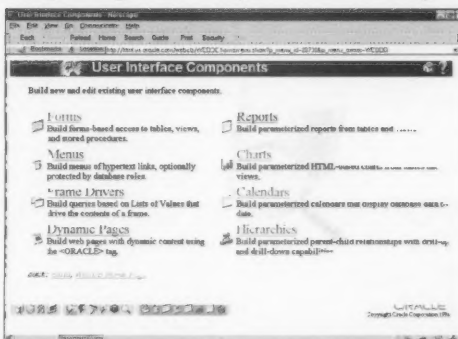
By David Orenstein

WHEN PRINCETON UNIVERSITY wanted to put an entire warehouse of data online, it made a point of picking a tool that developers don't need a Princeton Ph.D. to understand.

Princeton built its data mall with Oracle Corp.'s Web DB, one of two easy-to-use data publishing tools emerging in the market that let developers design useful, data-driven pages from within a browser.

Analysts said the emerging category of tools, which trade off power for rapid develop-

Data tools, page 46



Princeton's data mall was built with Oracle's Web DB, one of two easy-to-use data publishing tools now emerging

Microsoft, Platinum extend repository deal

By Stewart Deck

PLATINUM TECHNOLOGY, INC. and Microsoft Corp. two weeks ago announced that Platinum has been given the exclusive right to port the Microsoft Repository for meta data to non-Windows platforms. The deal also continues the two companies' working agreement to de-

velop the next version of the Microsoft Repository.

Repositories hold companies' meta data — the set of facts about warehoused data that tells where data came from and what applications are appropriate for it — and act as the glue that holds data sets from wide-reaching applications together. By doing so, the applications can

more easily sift through a data warehouse to search for trends.

A Platinum spokesman said the Oakbrook Terrace, Ill.-based company soon will issue the first beta releases of the Microsoft Repository for Unix platforms that include Hewlett-Packard Co.'s HP-UX, Sun Microsystems, Inc.'s Solaris and

Microsoft, page 48

ERP users need third-party reporting tools

By Craig Stedman

FOR MANY USERS of packaged applications, mixing real-time transactions with reporting is like mixing oil and water.

Take Chevron Products Co., for example. The petroleum refining and marketing unit of San Francisco-based Chevron Corp. tried to run analytical reports on its plant maintenance activities directly off of the Indus International, Inc. asset management software used to schedule and track repair work.

Good reporting is a critical part of Chevron's effort to enable the thousands of mechanics at its six U.S. refineries to work more effectively, said Sam Preckett, a former field maintenance supervisor and now IS manager for reliability-focused maintenance at Chevron Products.

Reporting tools, page 46

Chevron's Sam Preckett says ERP reports were too basic.

Reporting tools

CONTINUED FROM PAGE 45

But the custom reports run by the refining unit dragged down the Indus software's performance: Screen refreshes for mechanics trying to schedule repairs "could take over a minute," Preckett said.

And the reports were too basic to give executives at Chevron Products a deep view into "the nuances of maintenance," he added.

So Preckett's staff is now installing stand-alone data analysis software developed by Broadbase Information Systems, Inc. The Broadbase software is in limited use at two refineries and should be deployed at all six sites by year's end.

Separating out reporting from the maintenance scheduling

functions chopped screen-refresh times for Indus users to a matter of seconds in Chevron's tests, Preckett said.

The company can now tailor reports for mechanics, plant managers and other groups of users, he said.

BEEFING UP

Cytec Fiberite, Inc., a maker of adhesives and composite materials used in the aerospace industry, this summer also decided to go outside its main business applications to beef up the reporting that finance employees could do.

The Tempe, Ariz.-based company initially tried to get by with some custom financial reports that were written for The Baan

Co.'s application suite, which it installed last year to run Cytec Fiberite's finance, distribution and manufacturing operations.

But creating the reports was an elaborate and time-gobbling process, and users could pull only a few financial measurements out of the Baan software, said Orville Gore, accounting manager at Cytec Fiberite. "We were pretty much locked into just one [report] format," he said.

Looking to do away with those limits, Cytec Fiberite is installing financial reporting software from FRx Software Corp. at five sites.

Now, Gore said, he and other accountants can build their own reports and look at various financial indicators, such as quarter-by-quarter or month-by-month results.

Steve Bonadio, an analyst at Hurwitz Group, Inc., a consulting firm in Framingham, Mass., said reporting functionality often "isn't on the shortlist

of things companies look at" when they shop for packaged software.

Many users just try to make do with the canned report templates that come with their chosen applications, he said.

That can work, but only "if you don't need any depth to what you're doing" on the reporting side, Bonadio said. □

TOOLS OF THE TRADE

Different types of analysis software:

Products	Examples	Functionality
Query and reporting software	Cognos' Impromptu, Business Objects' Business Objects	Basic reporting and data calculations
Packaged analytical applications	Comshare's Decision, Hyperion's Enterprise	Pre-defined analysis routines for specific users
Online analytical processing tools	Hyperion Solutions' Essbase, Oracle's Express	Ad hoc analysis of data with multiple variables

Data tools simplify Web

CONTINUED FROM PAGE 45

ment, will help users solve the problem of quickly bringing data to the World Wide Web.

Web DB will enter beta tests this fall and will be released in December. Version 1.5 of Net.DB from Centura Software Corp., formerly Gupta Corp., became available Sept. 11. Oracle and Centura are both based in Redwood Shores, Calif.

"It's about ease of use," said Merv Adrian, an analyst at Giga Information Group in Santa Clara, Calif. Virtually code-free

Web design tools can enable even nontechnical users to create pages on corporate intranets, a role that used to require a Common Gateway Interface or a Perl programmer.

Putting a Web interface on top of a central repository of departmental data isn't a new or untried idea, said Steve Zoppi, a Burlingame, Calif.-based analyst at Meta Group, Inc.

He said Oracle's Web DB is just a particularly good attempt to marry Web objects to a data-

base and put control of them in reach of the average user.

Princeton's data mall has given thousands of students online access to their phone records and bills, given 800 administrators access to internal financial data and given admissions officials access to graduate school applications, said Rich Pickett, director of data administration. Web DB uses the security permissions already contained in the database to delegate access to users.

When the project started more than a year ago, Pickett said, "we needed to find a tool that was easy for my staff to develop with and easy to deploy to

Virtually code-free Web design tools can enable even nontechnical users to create pages on corporate intranets.

our users." Oracle consultants cooked up what now has become Web DB.

Pickett said the browser-based development environment lets him update sites remotely. "I do it on vacation. I take my laptop, and I'll sit there and change a report."

The limited capabilities of the tools aren't a crippling drawback, according to Pickett. "This

does not meet 100% of our needs, but it meets 80% to 85%," he said.

Zoppi said Oracle's tool doesn't offer any programming interfaces. Instead, Web DB is the conduit for simple publishing and query-based applications. Although Web DB could be extended with stored procedures, Zoppi said, Oracle hasn't said so.

Zoppi said he also was uncertain about the tool's scalability, although it performs well at dial-up speeds.

Web DB's pricing hasn't been set. Net.DB sells for between \$295 for a two-user license and \$595 for a 10-user license. □

Keeping supply under control

CONTINUED FROM PAGE 45

United Parcel Service of America, Inc., in a round-robin fashion via fax or E-mail. Once a load is accepted, final instructions are sent back to the supplier.

Since the system's March 16

debut, the inbound routing group has reduced staff by 25%, Simms said. But beyond payroll, he said even bigger savings have come from the routing optimization software.

"There can be a cost savings

of \$1,000 per shipment because the software helps us avoid buying less-than-truckload shipments," he said.

Analysts said the popularity of software tailored to supply-chain management is rapidly expanding. Advanced Manufacturing Research, Inc. in Boston estimates that licenses for supply-chain software will reach

\$1.4 billion this year and \$6.8 billion in 2002 (see chart).

Beth Enslow, an analyst at Gartner Group, Inc. in Stamford, Conn., said the supply-chain management software market can be broken into two categories: tactical and strategic.

TransPro is an example of tactical software because it helps with day-to-day logistics. Strategic software helps users re-evaluate distribution networks through modeling and what-if scenarios.

"Users need both types of software because with just tactical and no strategic, you may simply be putting a bad business process on steroids," Enslow said.

She also said companies can save between 18% and 20% on distribution costs if they conduct "a thorough rationalization" of their practices.

Examples of strategic supply-

chain applications include CAPS's Supply Chain Designer, Insight, Inc.'s Sails and I2 Technologies, Inc.'s Rhythm.

Pepsi-Cola General Bottlers, Inc. in Rolling Meadows, Ill., used Supply Chain Designer to help choose the locations for a \$21 million distribution center under construction in Chicago and a \$6 million facility being built in Peoria, Ill.

The software has saved money on consulting fees, said Pete Venegas, supply-chain manager at the bottler. But he said it isn't a silver bullet. "It lends a quantitative perspective to the interaction between variables [such as distribution costs, population growth and customer service]," he said.

"But it doesn't make decisions for you. If you try to rely on it for certainty, it will paralyze you with millions of questions," he added. □

Supply-chain management revenue

	1997	1998*	1999*	2000*	2001*	2002*
Software licenses	\$860M	\$1.44B	\$2.27B	\$3.5B	\$5.03B	\$6.83B
Maintenance	\$249M	\$387M	\$624M	\$975M	\$1.41B	\$2.11B
Implementation	\$567M	\$847M	\$1.3B	\$1.92B	\$2.91B	\$4.19B
Hardware	\$70M	\$112M	\$134M	\$155M	\$171M	\$184M
Other	\$45M	\$77M	\$126M	\$172M	\$222M	\$287M
Total	\$1.79B	\$2.87B	\$4.45B	\$6.72B	\$9.75B	\$13.6B

*Projected

Source: Advanced Manufacturing Research, Inc., Boston

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Microsoft repository deal

CONTINUED FROM PAGE 45

IBM's OS/390.

Oracle Corp. also offers a repository that runs on its own Oracle8 database.

The agreement will help software developers who work on both decision-support system applications and enterprise

resource planning software because it will encourage vendors to adopt a uniform standard for where meta data goes and what it looks like, said Robert Craig, an analyst at The Hurwitz Group, Inc. in Framingham, Mass.

"What Microsoft and Platinum are doing is creating the foundation for shared meta data across applications," Craig said.

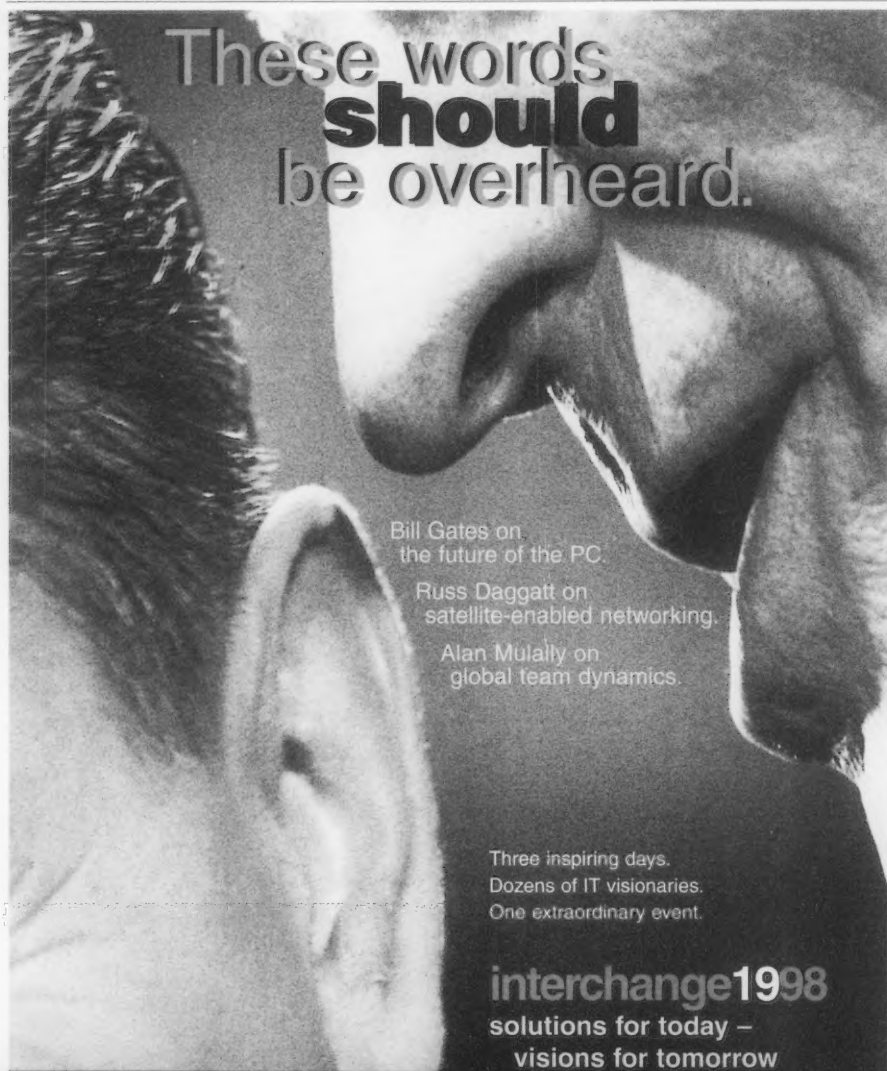
When applications share the same meta data, it eliminates the need for each application to keep a copy of each piece of data. By sharing uniform definitions, applications run more smoothly and data analysis is more precise. For example, without a repository, each appli-

cation could refer to Robert P. Smith in a different way — Bob Smith, Robby Smith, Robert Smith, Robert Phillip Smith — and miss the fact that they were referring to the same individual.

"We've needed a meta-data standard," said Craig Bell, assistant vice president and manager of data resource management at NationsBank Corp. in Charlotte, N.C. "And combining Microsoft's industry status with Platinum's position in data warehousing will bring us a lot closer to a de facto standard." More standards would make life significantly easier for users with multiple repositories and computer-assisted software engineering tools, Bell added.

NationsBank — the third-largest U.S. bank — recently built a data warehouse to improve information sharing among its more than 120 legacy systems.

Platinum and Microsoft also will work together on the next version of the Repository, which will be released sometime next spring. That edition, Repository 3.0, will include expanded modeling and tool support, scalability enhancements and integrated enterprise security to protect corporate data stored in the Repository. □



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NEW

PRODUCTS

VERITAS SOFTWARE CORP. has announced a version of NetBackup for Windows NT Server, backup software for Pentium and Alpha systems running Windows NT.

According to the Mountain View, Calif., company, the software now includes a Windows interface that follows Microsoft Corp. standards.

It supports online backups for Oracle7 and Oracle8 databases from Oracle Corp. as well as Microsoft Exchange and SQL databases. Support for Windows 98 clients also is included.

The software costs \$3,995 per server and \$50 per client.

Veritas Software
(650) 335-8000
www.veritas.com

STARQUEST SOFTWARE, INC. has announced StarSQL 2.6, software that connects Windows-based applications with IBM DB2 databases.

According to the Berkeley, Calif., company, StarSQL provides transfer of data from IBM databases on mainframe, midrange or Unix systems into Open Database Connectivity-enabled PC applications, such as Microsoft Corp.'s Excel, through either a TCP/IP or SNA network.

The software also has the ability to change mainframe or AS/400 host passwords from a PC.

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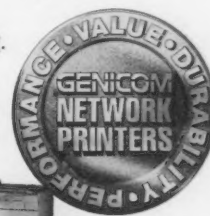


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Briefs

New DVD technology

Matsushita Electric Industrial Co. in Osaka, Japan, has developed a high-capacity optical disc technology that could possibly be used in rewritable digital video discs (DVD). The technology calls for bonding together two 0.6mm discs, creating recording layers in the disc. A 12cm version of the disc can hold 8.5G bytes of data, the company said. Existing DVD-RAM systems have capacities of 2.6G and 5.2G bytes. Although the Matsushita technology can easily be made compatible with existing DVD systems, it must first be accepted by the DVD Forum, a standards group.

IBM thin-client trial

IBM wants users of the company's Network Station to check out a "try-and-buy" program that lets them sample multiuser Windows NT applications. Starting next month, IBM will bundle a trial version of Citrix Systems, Inc.'s MetaFrame thin client/server software with all Network Station units. Also included are Network Computing Devices, Inc.'s WinCenter and IBM-owned Lotus Development Corp.'s SmartSuite.

Intel mindful of FTC probe

► May back PCI-X to thwart monopoly charge

By Jaikumar Vijayan
and Stewart Deck

THE FEDERAL TRADE COMMISSION's ongoing scrutiny of Intel Corp. could influence how the chip maker reacts to a new bus technology standard announced by Hewlett-Packard Co., Compaq Computer Corp. and IBM.

Compaq last week announced an improved bus design that reportedly will double the rate at which information can be exchanged between a computer's processors and devices such as printers or hard disks

[CW, Sept. 7].

Called PCI-X, the bus will operate at speeds of 133 MHz compared with the 66 MHz of today's industry standard, the Peripheral Component Interconnect (PCI) technology.

PCI-X should mean faster Intel servers for users. But because of its potential to replace the Intel-spearheaded PCI as an industry standard, PCI-X could also cause a rift between Intel and the three PC vendors.

Sherry Garber, an analyst at Semco Research Co. in Phoenix, said the move by IBM,

What is PCI-X?

A new bus technology developed by Compaq, IBM and HP.

Why is it important for users?

Bus technologies greatly influence server speed.

What is the current standard?

Peripheral Component Interconnect (PCI).

How is PCI-X better than PCI?

PCI operates at 66 MHz. PCI-X operates at 133 MHz.

HP and Compaq "is an attempt by these manufacturers to exert their . . . freedom of choice." That's because, until now, it has been Intel that really controlled how PCI is implemented in servers.

Intel is reported to be working on a successor to PCI, though no one knows when that will start shipping. Intel wouldn't comment on its plans.

"Where Intel's visceral reaction,"
Intel, page 52

PCI through the years

The PCI bus became popular after Intel started shipping its Pentium chip five years ago.

PCI was developed to address bottlenecks created by the previous generation of buses: Industry Standard Architecture (ISA), Extended Industry Standard Architecture (EISA) and IBM's MicroChannel Architecture (MCA). All those buses were too slow to take full advantage of the superfast chips that Intel was churning out.

ISA, for instance, operated at speeds between 4.77 MHz and 8 MHz. EISA — which was just an enhanced version of ISA — operated at speeds up to 16 MHz. EISA was announced in 1988 by a Compaq- and Intel-led consortium of vendors as an alternative to MCA. The standard flourished because of the broad vendor support it enjoyed, while MCA withered, mainly because it was considered too proprietary.

Intel's latest generation of chips has begun taxing even PCI, which is why the new PCI-X standard is needed for better server performance.

— Jaikumar Vijayan and Stewart Deck

HP extends backup line

► SureStor additions support larger systems

By Nancy Dillon

HEWLETT-PACKARD CO. last week announced additions to its SureStor tape backup line designed to support larger, more

centralized backup systems.

A key new product for centralization is SureStor Fibre Channel SCSI Bridge 2100 ER, which is due in January. The \$8,995 external bridge will let HP's 15-slot, SureStor digital linear tape (DLT) library connect to a Fibre Channel loop. It was designed to allow up to eight HP NetServer-series servers to share one library.

"The trend in backup is to connect multiple servers onto one bigger library," said Farid Neema, an analyst at Peripheral Concepts, Inc. in Santa Barbara, Calif. "Fibre [Channel] will give a big boost to this concept because it can extend over long distances [up to 10 kilometers]." He said SCSI's length restriction of 25 meters makes such libraries difficult to create.

Neema also said that because most libraries today are SCSI-based, people will have to use bridges to start linking libraries. He said full Fibre Channel libraries aren't due for about another year.

HP also announced SureStor DLT Autoloader 718 and HP, page 52

Snapshots

Worldwide PC server shipments

	Q1 1997	Q1 1998
Compaq Computer	114,660	145,625
Hewlett-Packard	51,890	70,640
IBM	44,070	52,260
Dell Computer	21,050	46,915
Digital Equipment	17,251	22,243
NEC	11,066	15,601
Acer America	13,010	14,310
Siemens/Nixdorf Information Systems	11,315	13,267
Fujitsu America	11,583	11,050
Gateway/ALR	6,080	8,250
Other	82,285	90,694
Total	384,260	490,855

Source: International Data Corp., Framingham, Mass.

Vicinity debuts mapping system for PalmPilot

By Tom Diederich

LOST DRIVERS no longer have to worry about pestering gas-station attendants for directions — as long as they are toting a PalmPilot.

Vicinity Corp. has rolled out what it calls the first Internet-based map service tailor-made for 3Com Corp.'s PalmPilot and Palm III handheld computers.

Before hitting the road, PalmPilot users connect to the Internet via their PCs, visit Palo Alto, Calif.-based Vicinity's Pocket MapBlast Web site and input their starting points and destinations, according to a Vicinity spokesman.

The resulting map is then formatted for the PalmPilot with software available on the site and is ready to be transmitted to the handheld device.

A spokesman for San Mateo, Calif.-based AvantGo, Inc. — which designed the freeware used to convert the maps for the PalmPilot — said a single download can lead drivers across town, across the state or across the country.

Although there is no zoom option for the PalmPilot version of the application, the image-and-text directions are broken down into easy-to-follow sections that are accessed with the scroll bar, he said. □

Intel may back PCI-X bus

CONTINUED FROM PAGE 51

tion might have been to go after these guys, they might be advised now to hang back" in light of the FTC antitrust investigation, said Robert Heller, a lawyer who specializes in antitrust issues at the law firm Kramer, Levin, Naftalis & Frankel in

New York. "In Intel's assessment of the competitive world, they now have to keep in mind the fact that the government has its thumb on the scale."

Intel is under investigation by the FTC for possible antitrust violations and is

also the target of a private antitrust suit filed by Intergraph Corp. in Huntsville, Ala.

COUNTERATTACK COULD BACKFIRE

As a result, "if Intel took some sort of pernicious action against the three vendors because they want to create a future [PCI] standard, that could potentially add to the government's case," said Jonathan Eunice, president of Illuminata, Inc., a

consultancy in Nashua, N.H.

Instead, Intel might choose to cautiously endorse the new technology when it is put before the PCI special interest group for approval as an industry standard, analysts said.

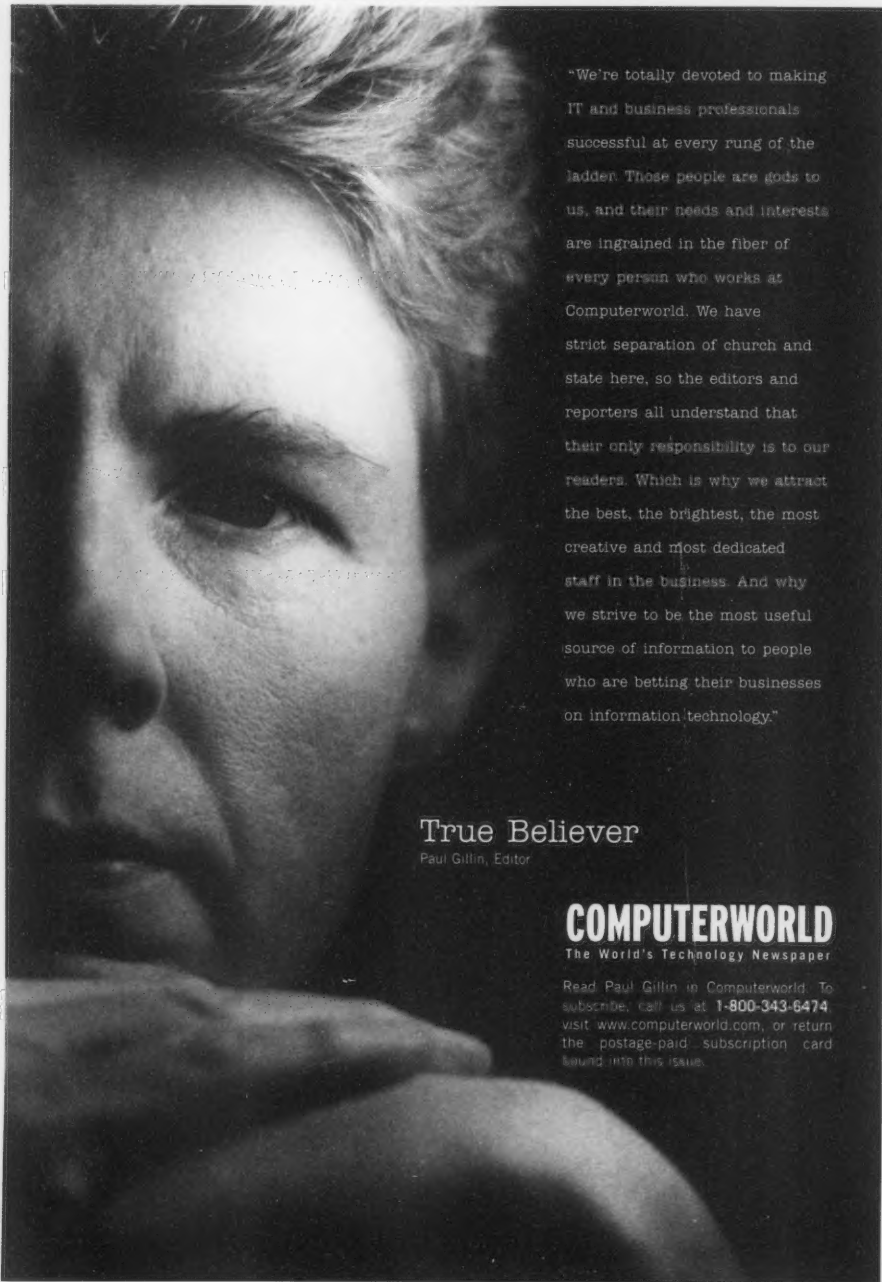
Doing so might allow Intel to demonstrate to the FTC how the market is still competitive and not monopolized, Garber said.

With PCI-X's higher speeds, HP, IBM and Compaq will finally have control over a piece of technology that will allow them to differentiate their servers — by offering things such as faster peripherals and disk drives — from mass-volume servers based on Intel's processors and technologies, analysts said.

Meanwhile, if PCI-X is approved by the PCI special interest group, Intel could drop its own efforts to develop a successor to PCI or continue to push it, said Dean McCarron, an analyst at Mercury Research, Inc. in Scottsdale, Ariz.

"It's going to be up to Intel to decide whether there's going to be two standards or not," McCarron said.

Following the announcement of PCI-X last week, an Intel spokesperson said the company must review the specification fully before it can "intelligently respond." □



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HP expands line

CONTINUED FROM PAGE 51

SureStor DLT 701, both due Oct. 1.

The 718 was designed for small or remote offices. It has one DLT 7000 drive, two fixed tape slots and six removable tape slots. Using all eight slots and 35G-byte DLT 7000 tapes, the \$11,495 unit has a 280G-byte native capacity.

The 701 is an internal DLT 7000 drive for high-end, stand-alone servers. It costs \$7,719.

Market analysis firm Freeman Associates, Inc. in Santa Barbara, Calif., estimates that the automated DLT library market will grow by 47% a year through 2002. It found that 15,654 DLT libraries shipped worldwide last year, and 46,190 are expected to ship in 2002. □

NEW

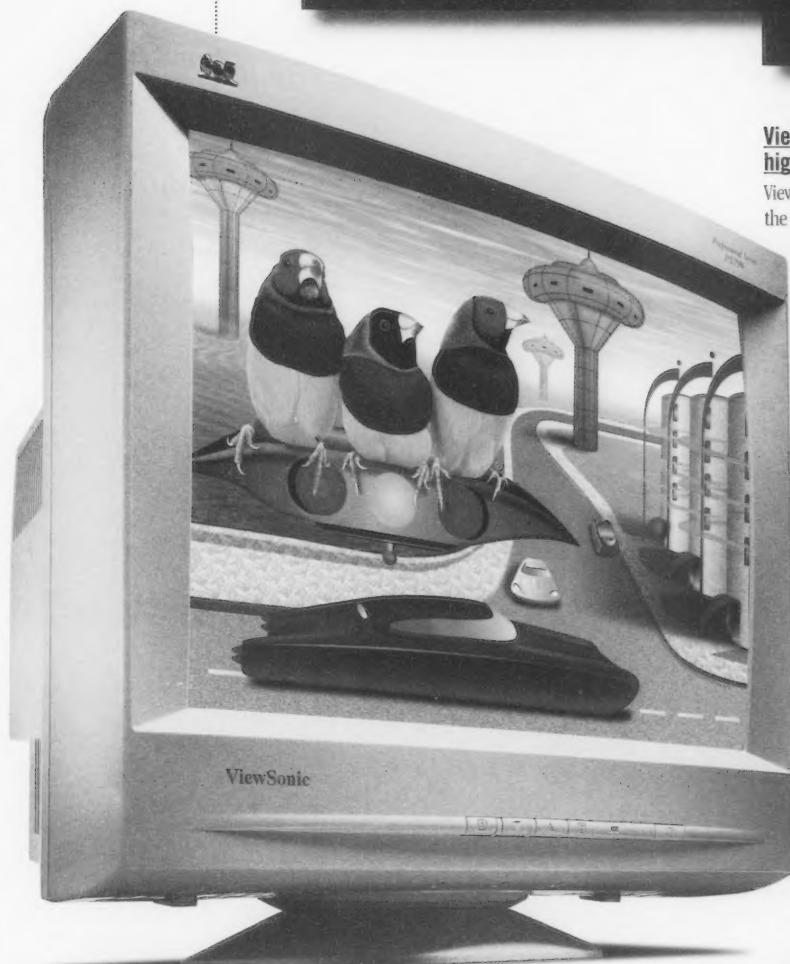
PRODUCT

NUMBER NINE VISUAL TECHNOLOGY CORP. has announced a 32M-byte version of its Revolution IV graphics accelerator.

According to the Lexington, Mass., company, the high-end graphics card for Windows systems is based on a 128-bit graphics chip. It provides acceleration for 2-D, 3-D and video and can support resolutions up to 1920 by 1200 pixels. It costs \$219.

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SPECIAL REPORT ERP

SPECIAL REPORT

ERP: The Next Stage

ENTERPRISE RESOURCE PLANNING has survived a stormy, painful infancy — marked by eye-popping project blowups and a horrendous labor shortage — and looks like it's here to stay. Analysts say 70% of Fortune 1,000 firms have or will soon install ERP systems, which should boost the global ERP market from \$15 billion now to \$50 billion over the next five years.

Now that SAP, Baan, Oracle and the other ERP vendors have conquered most of corporate IS, where is this critical technology heading next?

In this special report, *Computerworld* looks ahead at how users will put ERP to work, vendors' plans for the future and career opportunities. We also ask whether ERP might be sowing the seeds of its own demise.

56 ERP'S EXPANDING UNIVERSE: At Manufacturers'

Services, says Vice President John Walshe, ERP is the foundation of the merger strategy and the lifeblood of international customer service. His company illustrates where users are taking ERP: from automating back-office and factory operations to supporting customers, decision-making and business strategies.



60 QUICKSTUDY: WHAT IS ERP? For those new to ERP, QuickStudy defines ERP and tells you what can make up an ERP system.

62 SOUNDOFF! IS ERP IN TROUBLE?

You bet it is! ERP can't support a real-world supply chain, says Forrester Research's Bobby Cameron (right). Are you kidding? With 35%-plus market growth, ERP is here to stay, says Jim Shepherd at Advanced Manufacturing Research (pictured at left).



64 OPINION: Stop obsessing about products. The IT industry, including ERP vendors, should focus on keeping promises, partnerships, scalability and support, writes columnist Peter G. W. Keen.

66 VENDOR DIRECTIONS, USER WISH LISTS:

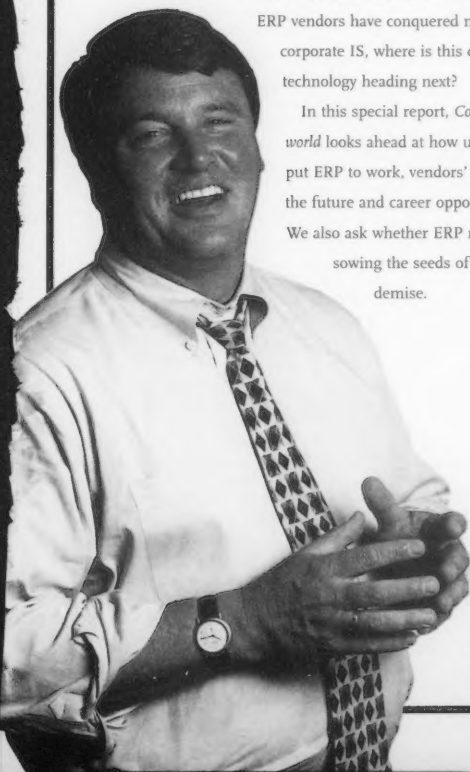
The Big 5 ERP vendors are expanding the scope of their packages and chasing after vertical industries, but they may be out of sync with users, such as Farm-land's Dick Weaver, who want them to focus on functional improvements in today's products.



ERP MEANS DOUGH-RE-MI: Expertise in ERP is commanding high salaries. A year's experience can mean an annual salary of close to \$75,000, and people with three to five years in ERP work can command up to \$200,000 with the right consulting firm. **FOLLOWS PAGE 68**



AMR Research's Jim Shepherd: Customers' desires and vendors' offerings have converged



OVERVIEW

AN EXPANDING

ERP is growing from being just an efficiency tool to one that can also help a company grow

By Kathleen Melymuka

Manufacturers' Services Ltd. in Concord, Mass., is a \$900 million company that's grown dramatically through acquisitions in Europe, Asia and the U.S. It's using The Baan Co. software as the glue that keeps it all together.

"Traditionally, people have looked to ERP to run their basic operations," says John Walshe, vice president of information systems. "We want ERP to be an integrator for the company."

Manufacturers' Services provides electronics manufacturing services. For example, a large computer vendor might sell point-of-sale systems to a large retailer with locations in several countries. The vendor then hires Manufacturers' Services to make and ship those systems to the customer.

Its acquisition plan includes buying plants from customers, and because the plants initially have different systems and environments, Walshe is counting on Reston, Va.-based Baan USA, Inc. to provide a "common language" for the company worldwide. His goal: improve service, especially for his international customers. With ERP, he says, "I can deal with you as a common

company, regardless of where your operation is."

For example, Walshe says, if a customer sells cash registers to a company in Europe and the U.S., ERP makes it easy to transfer design data and products from location to location and to leverage skills and resources worldwide, improving customer service. It also allows Manufacturers' Services to leverage volume purchases, lowering customer costs.

Manufacturers' use of ERP to integrate the company is but one example of how the ERP universe is expanding on many levels. Where once it automated human resources, accounting and manufacturing, it now facilitates decision-making in

customer support and supply-chain management. Users' visions of ERP are evolving from tactical to strategic, and users are no longer forced to choose between integration and function. With new, add-on components, they can have it all.

Vendors, meanwhile, are expanding their target markets, focusing on smaller companies and working with independent software vendors to provide specialized, integrated components to complement their offerings and broaden ERP's capabilities.

The current market is estimated at about \$14.8 billion per year, with market penetration at about 20%, according to John Bermudez, an analyst at AMR Research, Inc., a

Boston-based consulting firm. AMR expects the market to soar to \$52 billion by 2002.

OUTWARD FOCUS

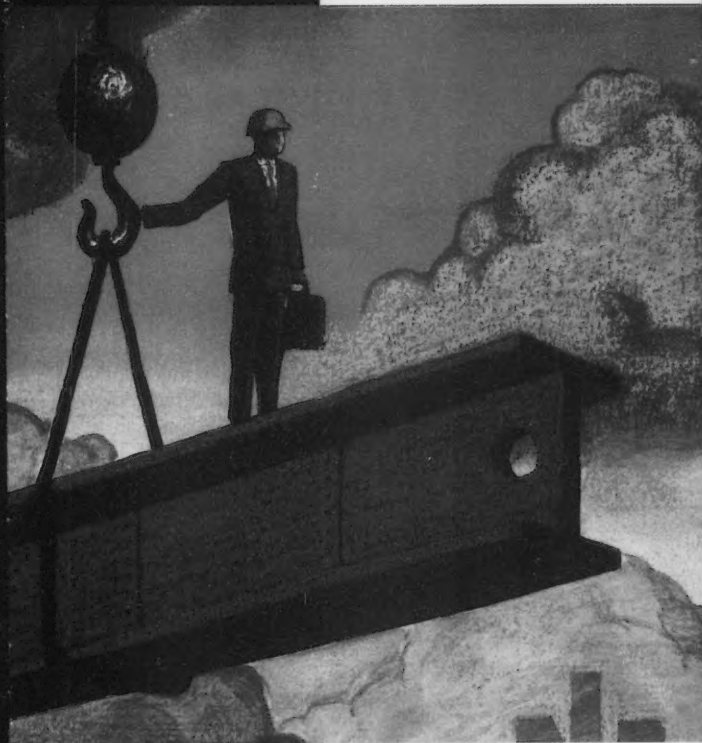
Walshe's primary ERP objective is to provide a common company environment to serve customers on three continents. That type of use is increasingly common. "Recently, there has been more of a focus on the customer and service side," says Bruce Bond, an analyst at Gartner Group, Inc. in Stamford, Conn. "You need to be better able to predict when you can actually deliver, you need to understand what is available, you need to understand customer history, you need better information about pricing — and you now have the ability to look at this in an ERP product."

That evolution reflects a change in the outlook of American CEOs, says Andrew Zoldan, director of supply chain at SAP America, Inc. in suburban Philadelphia. Five years ago, he says, CEOs were concerned with profitability and the internal efficiency that led to it. Today's CEOs are looking outward and driving for market share, which requires satisfying customer demand.

As a result, ERP vendors are addressing issues such as customer support, sales force automation, advance planning and scheduling and supply-chain decision support. "Supply-chain and customer rela-

White
Paper

SEPTEMBER 14, 1998



Industrial-Strength IP Connects Companies and Applications

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BQM MOM AKA Message Queuing

BQM. MOM. Message queuing. Together, these terms describe a class of messaging technology intended to support interprocess communication in loosely coupled distributed systems. Business quality messaging (BQM) captures one goal of this technology: to provide a business grade quality of service much higher than what is found in ordinary messaging—high enough, in fact, to support mission-critical distributed processing.



In April 1997, AT&T, Compaq, IBM, Intel, Microsoft and other companies formed the BQM Forum to accelerate and promote development of BQM products for enterprise applications. To date the Forum's most visible output has been functional specifications for product interoperability, and a multi-vendor BQM service demonstration, both touched on later in this article.

Messaging-oriented middleware (MOM) broadly describes the technical means used to achieve BQM. It too has a support group, the Messaging Oriented Middleware Association (MOMA), whose mission is education, promotion and support of MOM. MOM is architecturally quite similar to ordinary messaging; the differences lie in functionality and the quality of service delivered.

Message queuing is the technology used to support transaction processing, a key application for BQM but not the only one. Message queuing was originally developed as a means for managing transaction processing in monolithic mainframe applications; it found its way into MOM with the emergence of distributed transactions.

This article will be of help to users of conventional messaging who want to

► BQM has emerged in response to the corporate need for distributed processing solutions. During the transformation from centralized to networked computing, applications and data were physically dispersed across the hardware base, creating a need to link these components.

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understand BQM, where it came from, how its technology works, what it's good for, and how it may evolve. Although the article looks closely at products from IBM and Microsoft, two of the major suppliers in this industry, there are many other vendors and products. What follows is meant to be an overview, not a product comparison.

History of middleware

BQM has emerged in response to the corporate need for distributed processing solutions. That need is a product of the evolutionary process through which the centralized computing environment of the 1950s was transformed into the physically dispersed (networked) environment of the 1980-90s. During that transformation, applications and data sources were physically dispersed across the hardware base, creating a need to link once centralized but now dispersed components.

By the 1980s, LAN and WAN technology had matured sufficiently to provide the communications foundation needed to support such applications. However, building the applications proved difficult because of the thick layer of infrastructure needed between the application components and the supporting network. This infrastructure had not only to move units of information reliably between linked applications, but also to ensure orderly sequences of processing and guarantee proper completion of distributed transactions.

It became clear to vendors that this infrastructural "glue" was similar from one application to the next.

The success of the BQM Initiative is due to the efforts of members of the Forum, especially the founding members: AT&T, Compaq, IBM, Intel and Microsoft. Their common commitment to creating reliable messaging solutions for business-to-business connectivity and their aggressive product development efforts have spurred nearly 150 companies to join and support the BQM Forum's efforts.

AT&T worked with Intel and Control Data Systems to create the first BQM prototype, connecting Microsoft Exchange folders through a BQM-enabled version of an IP service on Compaq servers. IBM's MQSeries was the first BQM product, and Microsoft's MSMQ was launched in 1997.

The BQM Forum is helping corporate IT developers reliably connect applications and networks using low-cost TCP/IP messaging tools. In less than a year, nearly a dozen BQM-enabled products have been introduced. Future BQM prototypes include reliable connections between ERP applications and value-added IP services from VANs and ISPs. The promise of connecting applications and businesses via reliable TCP/IP messaging is quickly being realized.

This document was independently written by the Burton Group and appeared in the Rapport Messaging Review Newsletter, February/March 1998 Volume 3, Number 3 edition. This Burton Group report is not intended to be viewed as an endorsement or sponsorship of any particular vendor who may be associated with the BQM Initiative.



► Store-and-forward messaging was originally designed for communication among human beings—notoriously asynchronous objects—and over unreliable networks such as the Internet.

IBM initiated a research program on queuing and distributed transactions, which led to the emergence of its MQSeries product line about five years ago. MQSeries pre-packages all the machinery needed between a collection of linked applications and the underlying networks. Hence the term “middleware.”

The key selling point for such middleware is that it frees an application developer from all aspects of physical distribution. The developer must be aware of the logical partitioning of an application into processing modules, and of the information flows between those modules, but need not be concerned with the locations of the modules. Middleware provides transparent support for the physical distribution of the processing elements and for any subsequent rearrangement.

Roots of MOM: messaging

The applications to be supported by such products share three characteristics.

- 1) They are loosely coupled, meaning that individual software components are not permanently bound together in a single, dedicated system. Some components, such as data resources, may serve many purposes and participate, at different times, in multiple distributed solutions.
- 2) Within a single application, the components may be subject to different schedules. Some may run continuously, others in batch mode at possibly different pre-scheduled intervals.
- 3) The supporting infrastructure may be unreliable.

Individual platforms may be provided by PCs, laptops, workstations, servers and mainframes, built and operated to widely differing reliability standards. Interconnecting the physical elements may require a variety of networks, from intrinsically reliable LANs to corporate intranets to the Internet itself.

Together, these requirements demand a solution that is intrinsically asynchronous and persistent. Asynchronous in that a communication can enter the system at a time when the target for that communication is unavailable due to scheduling, component failures or other causes. Persistent in that the communications medium must ensure delivery of the communication in the face of arbitrary delays while failures are cleared up or processing schedules play out.

Store-and-forward messaging lends itself to this situation because its core properties are precisely those needed. It achieves the necessary asynchronism and persistence by combining storage with the physical movement of information. Store-and-forward messaging was originally designed for communication among human beings—notoriously asynchronous objects—and over unreliable networks such as the Internet.

Although BQM exhibits the asynchronous character of conventional messaging, it requires a much higher quality of service. For example, it wouldn't do to run mission-critical applications over an SMTP message system. Although each server exercises care in moving traffic to the next, the overall quality of service (QOS) is not up to the task. One of BQM's contributions is to

► The whole point of BQM is to support transaction processing within environments that vary widely in their speed and quality.

add machinery to messaging that raises it to a much higher level of service quality.

Queuing

MOM can be thought of as merging two once distinct technologies: messaging and queuing. Queuing technology goes back to transaction processing systems, developed in the 1960s to support applications such as airline reservations that were subject to real-

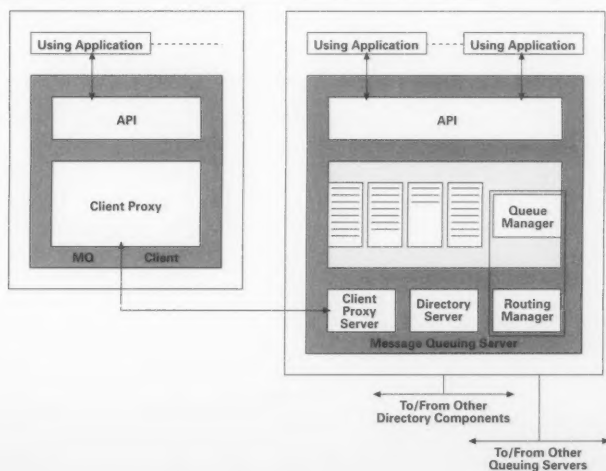
time streams of incoming data. IBM's CICS is an example of an early transaction processing system. In such systems, queuing technology provided the buffering and control mechanism needed to support orderly and properly sequenced transaction flows between individual processing elements.

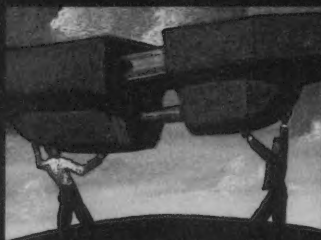
By combining it with messaging, BQM maps the principal elements of queuing technology from the mainframe environment in which it originated to the

distributed environment of today. In so doing, it upholds the stringent quality of service needed in traditional transaction processing ... with one major exception. That exception is the guarantee of realtime or near realtime execution, a requirement that can be met where BQM runs on a dedicated, high bandwidth system, but not in the ordinary computing environment. In fact, the whole point of BQM is to support transaction processing within environments that vary

COMPONENTS OF A MESSAGE QUEUING SYSTEM

FIGURE 1

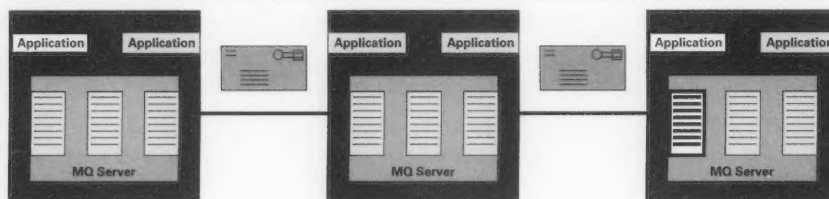




► BQM couples the tight control discipline of queuing technology with the asynchronous character of messaging.

STORE-AND-FORWARD TRANSFER IN BQM

FIGURE 2



widely in their speed and quality.

In BQM, complex transactions may play out over arbitrary time periods depending on the availability of individual components, but, however long it may take, the information flows between those elements are ensured to a high degree of reliability, and the logical sequencing of events is rigorously maintained. BQM couples the tight control discipline of queuing technology with the asynchronous character of messaging.

Technology of BQM

Fig. 1 (p. 5) shows the principal components of a message queuing system. The following descriptions emphasize the similarities and differences between BQM and conventional messaging.

Components

A *message queuing server* provides message routing and storage services. In conventional messaging terms it combines the functions of a message switch or mail server and a mailbox server.

Within the server, the *routing manager* handles all aspects of message routing and drives the underlying communications layer(s) to move traffic to and from

other servers. In so doing it exercises a protocol equivalent to P1 or SMTP but more complex, and at this point not standardized across products.

The *queue manager* is equivalent to the processing element in a mailbox server.

Message queues are equivalent to mailboxes but treated more freely. Message queues provide input buffers for application components, which can establish such queues as needed. An application component can create multiple queues, and several components can share a single queue, for example, to support load balancing.

Message queues normally support a first-in first-out (FIFO) discipline, but, depending on the product, may also support extraction by priority or by specific identifier. The removal of a message from a queue can be destructive (cut) or non-destructive (copy).

The *API* provides operations required for interaction between the client application and queuing system, principally for dispatching messages and extracting inbound messages from local queues. Also included in the API are operations for creating and removing queues. The calls available on the API factor out all aspects of the physical environment and the distribution of application elements across that envi-

COMPAQ

The Business Value of Networked Computing

ronment. Queues and other objects are referenced by name; the BQM software assumes all responsibility for mapping names to physical locations and for driving the underlying transport facilities.

The *directory server* provides access to a system-wide directory, which serves primarily to support name-to-address mapping. This frees the application developer from any concern with the location of a queue, and also allows applications to be physically redistributed without disrupting their internal communications.

The *client proxy server* is a protocol driver that makes it possible to remote the API onto a physically separate client machine.

Messages and routing

Fig. 2 (p. 6) shows the flow of information through a message queuing system.

Message routing. Store-and-forward transfer is used to move messages from sending applications to recipient queues. There are no surprises here, but the techniques used to ensure reliable transfer are one of the key distinctions between BQM and conventional messaging.

Message addressing. Messages are addressed to named recipient queues, with the directory providing mapping from names to physical locations.

Message structure. BQM messages exhibit the familiar header-body structure of conventional messaging. The header contains addressing and control fields, which may include identifiers placed there by the application. The body may contain any application data, but

As a strategic member of the BQM Forum since 1997, Compaq Computer Corp. is helping to advance the availability of reliable business application solutions that operate within corporate intranets.

The evolution and merging of open industry-standard computing with proprietary systems and applications has generated a requirement for easy integration into these systems. Each system, with its business rules and processes embedded within, traditionally has its own database, database structures, communication protocol(s) and client software. BQM provides a reliable, scalable technology with which to integrate these systems. Compaq believes that BQM technologies will enable businesses to integrate their production systems, as well as migrate from current systems to newer distributed systems, as business requirements dictate.

BQM technologies also spur the continued evolution of industry-standard network computing by allowing these systems to interoperate within a common framework as well as enabling disparate systems of separate businesses to communicate with one another.

Compaq has always understood the business value of "networked" or "internetworked" computing. The BQM Forum members and its supporters are key to providing the enabling technologies for moving industry-standard networked computing forward. Compaq is proud to be a part of the BQM Forum and its efforts.



► BQM departs most from conventional messaging in its QOS guarantees, and the machinery that supports them.

there are no standards equivalent to MIME or SMIME for internal body structure.

Security. BQM offers security safeguards which are the equivalent to those available in conventional messaging. These safeguards are either integrated into the product or available as external services.

Quality of service

BQM departs most from conventional messaging in its QOS guarantees and the machinery that supports them. Some of these are listed below.

Assured delivery. Much effort is exerted to ensure that each message is delivered undamaged in spite of system failures, which may be both serious and permanent. This means more than just recovering from network outages. In this respect, BQM goes much further than conventional message systems, whether standards-based or proprietary.

Just once delivery. If in doubt about the fate of a message, it is not acceptable just to "try again" to deliver it. For many applications, a double-delivered message can be just as destructive as a non-delivered message. BQM products ensure that messages are reliably delivered, but never delivered twice.

Sequenced delivery. Many applications require accurate sequencing in the information flows between processing elements. This means that messages must be placed in delivery queues in the order sent, not the order received into the destination server. This must be ensured even when messages pass one another in

transit due to route changes or other causes.

All of this suggests an end-to-end concern in the message transfer service over the fate of each message, well beyond the "level of concern" present in ordinary messaging. This end-to-end concern—implemented by stringent message tracking provisions—is the cornerstone of BQM's QOS. The theory is that if you have precise knowledge about the status of a message, you can correct most of the problems that may arise. This is not unlike the tracking capabilities of courier services such as FedEx. However BQM has a big advantage in that, unlike physical packages, damaged or lost messages can be recreated from backup queues. QOS mechanisms in BQM include the following:

- System-level acknowledgements between servers and end to end across the entire path.
- Extensive logging and journalizing, plus the ability of routing agents to re-send journalized messages based on timeouts or negative acknowledgements. (Note that these functions make use of inter-server notification messages and extensive use of administrative queues—the same machinery that supports the payload of the system.)
- Sequence stamping and message identification to prevent duplicate or out of sequence delivery.
- Sliding window protocols for the retransmission of messages.

Combine these and the result is analogous to TCP vs IP. BQM adds to messaging something like the QOS that TCP adds to IP. In IP, the Internet moves packets on a



IBM MQSeries: BQM At Work

"best efforts" basis. TCP adds machinery to IP that ensures reliable, in-sequence delivery of all packets sent.

But there are two caveats. The first is that all of this comes at a cost—in processing, storage and communication resources required for the QOS machinery, and, due to their greater complexity, in the products themselves. To ameliorate the first of these costs, products typically allow users to select from two or more grades of service, with the lower grades calling into play less of the QOS machinery.

The second caveat is that nothing is completely safe. If the entire system fails permanently, there is no recourse. To that end, the designs of these systems acknowledge that failure can occur, even with the most stringent QOS provisions. To accommodate failures that cannot be overcome automatically, these systems provide for manual intervention with system-wide management capabilities, "dead letter" queues and related mechanisms.

Distributed transactions

For many applications, the reliable transfer and queuing machinery of BQM provide all the middleware support needed. However, BQM is intended to go beyond this and support applications requiring transactions, which, though distributed in time and space, must be treated as atomic events. Such a transaction may include multiple component operations including sending and receiving messages, updating data resources and the like. Their governing characteristic is

Client: TOYOTA

Goal: *Faster and more efficient customer service*

Issue: *To improve communications throughout the value chain*

Reaction: *"MQSeries is used throughout our network to ensure that all transactions are processed quickly and reliably—even between different systems that may be separated by many time zones. It is very fast and we never lose any records or data. The direct linking of headquarters to distributors, factories and dealers means that customer's requirements are met more quickly."*

—Pierre Maes, Team Leader
Toyota European Network

Client: COMMONWEALTH OF MASSACHUSETTS

Goal: *Saving tax dollars and improving citizen services*

Issue: *Better information exchange between different government agencies*

Reaction: *"The agencies need to exchange data to identify fraudulent welfare claims. Normally this was done via tape transfer and took up to several days. With MQSeries the data matching process now takes hours, saving us considerable tax dollars by maximizing our revenues and reducing fraud."*

—Anna dos Santos
Enterprise Applications Bureau Director

Facts:

- ◆ MQSeries integrates applications across 35 different platforms including Windows NT, HP-UX and MVS.
- ◆ More than 5,000 corporate customers use MQSeries.
- ◆ Over 250 independent organizations provide MQSeries products and services.
- ◆ MQSeries is the undisputed market leader in message-oriented middleware.
- ◆ www.software.ibm.com/ts/mqseries/



► BQM adds to messaging something like the quality of service that TCP adds to IP. In IP, the Internet moves packets on a best efforts basis. TCP adds machinery to IP that ensures reliable, in-sequence delivery of all packets sent.

that they cannot be permitted to partially succeed. Total success is the desired outcome, but if any operation within such a transaction cannot succeed, then the entire transaction must be aborted as if it had never been initiated. That means that all component operations must be undone or "backed out."

An example is a funds transfer between two accounts. From the requester's point of view this is a single transaction, but internally it will require at least two components: a debit to one account and a credit to the other. Unless both operations succeed, the overall system will be left in a confused state likely to require expensive human intervention. Thus, if the debit oper-

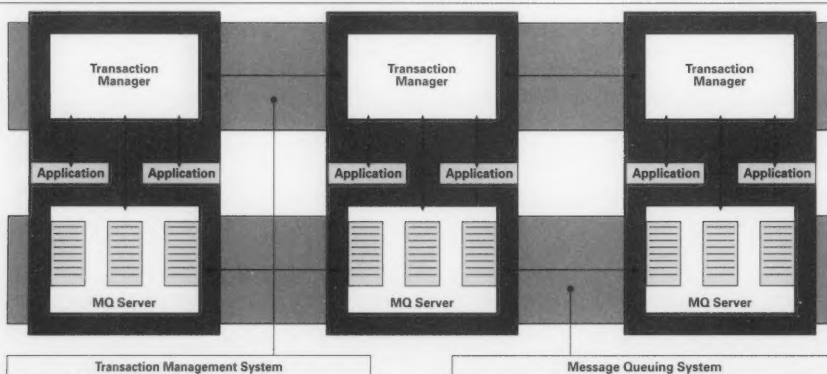
ation succeeds but the credit fails, the debit must be reversed to restore the system to a "clean" state. The transaction can then be tried again.

In practice even such a simple transaction may involve a considerable number of internal operations, and if the supporting communications are provided by a message queuing system, several of those operations will involve the manipulation of messages and queues, and all must be backed out in the case of partial failure. Thus the message system must be fully engaged in the overall transaction environment.

To support this kind of operation, BQM vendors have made it possible to interface their products with trans-

MANAGING DISTRIBUTED TRANSACTIONS

FIGURE 3





Raising the Bar for E-Commerce Solutions

action management systems, yielding the architecture in Fig. 3 (p. 10). The transaction management system is itself distributed across the same hardware environment as the message system. It comprises a network of peer transaction managers that collaborate so as to coordinate among the components of each distributed transaction. This requires a two-way flow of information and control between the transaction managers and the software elements actually performing the work, including elements of the message queuing system. In particular, active software elements initiate transactions and report progress to their respective transaction managers. The latter, in turn, ensure that the transaction as a whole moves through the phases necessary for orderly completion and, if necessary, signals each element to undo the component operations it has performed.

Summary

Described above is a message technology similar to conventional messaging at the architectural level, but with additional engineering designed to provide a reliable platform for distributed applications. It is these provisions and the resulting service that make BQM unique, and give it great future promise. The three principal departures from ordinary messaging are:

- 1) The industrial-strength precision and reliability of BQM service as realized with stringent QOS machinery and built-in system-wide management.
- 2) The direct involvement of the message systems in the semantics of the application through the ability of

Intel is committed to raising the bar on quality of service for e-commerce solutions. Intel's focus on reliability starts with the Pentium II Xeon processors, but also includes the server platform, software and the networks.

Message queuing technology (BQM) running on Intel Architecture allows business-to-business transactions to run reliably over networks regardless of the quality of the network.

Intel helped deploy prototypes of the first BQM-enabled products in September, 1997 and worked with AT&T and Control Data Systems to build the first example of a BQM-enabled network in March, 1998. These demonstrations rely on standard, off-the-shelf building blocks to provide reliable service across a network or even the Internet. The building blocks include Pentium II Xeon processor-based servers running Microsoft Windows NT and message-oriented middleware from IBM and Microsoft. Key reliability features of the Pentium II Xeon processor, such as Error Correcting Code and thermal sensing, are coupled with system-level features such as hot-swappable I/O boards, hard drives and power supplies.

Intel continues to drive the adoption of BQM for TCP/IP-based applications. Intel Architecture-based servers are available today to run BQM-enabled applications and networks. The promise of e-business using easily integrated, commercial, off-the-shelf products is becoming a reality.



► BQM has reached the point where it is of interest to users to interconnect their systems and thus create distributed processing systems on an intercorporate scale.

processing modules to create and utilize message queues as needed to suit the requirements of their interactions with other modules.

3) The ability to interface the message queuing system to transaction management solutions where atomic, unit-of-work transactions must be supported across a distributed environment.

State of the industry

Steve Craggs of Candle Corp. (a major IBM ISV and supplier of BQM-related products) says that 1997 sales for core BQM solutions were \$160 million and forecasts \$250 million in sales for 1998. Extrapolating that 56% 1997-98 growth rate gets us to about \$400 million for 1999, \$600 million for 2000 and \$900 million for 2001, figures that are consistent with a high-potential industry entering the rapid growth phase of its lifecycle.

At present, IBM's MQSeries product leads with about 60% of the market, and IBM claims about 5,000 customers to date for MQSeries. IBM has seen the potential for building distributed applications across the heterogeneous environment that is a fact of life in most corporations: MQSeries is available on and interoperable across no less than 35 platforms. Microsoft's newer MSMQ (Microsoft Message Queuing) product is deeply integrated into the NT runtime environment and is intended by Microsoft to be the premiere BQM solution for NT users, but is not available on other platforms. Non-queuing and queuing clients are available on Windows9x. Besides IBM and Microsoft there are some 15

other vendors of core and/or related BQM products.

There are no industry standards in the sense of SMTP/MIME. However, the BQM Forum was founded in 1997, as Mark Smith of Intel puts it, "to forestall the API wars" that disrupted mainstream messaging in the early 1990s. As a first step, the Forum has released a "functional standard" for interworking between products. The intent is to foster sufficiently consistent functionality that gateway/bridging can be accomplished.

Whether that standard will hold up in the face of continued technical evolution is in question, as is the eventual development of a complete standard. However, the complexity of BQM suggests that it may remain in the bridging stage for some time. For this reason, bridging products are a rapidly growing part of the industry. Vendors of such products include Candle Corp. and Level 8 Systems, whose products are prominent in the Microsoft literature.

BQM has reached the point where it is of interest to users to interconnect their systems and thus create distributed processing solutions on an intercorporate scale. This promising development is, in effect, a new generation of electronic data interchange (EDI) that could support continuous transaction flows between corporations. A way to do this is through third-party service providers who would provide buffering and bridging between trading partners and a switching point where multiple players are involved, much as the EDI service industry emerged in the early 1980s.

To promote such a development, the BQM Forum

Microsoft

Easier Development of Business Applications

has drafted a service provider specification similar to the functional standard cited above. Earlier this year, the Forum demonstrated a prototype AT&T BQM service in which users running SAP R/3 applications and equipped with MQSeries on NT servers exchanged data through an AT&T network based on MSMQ. AT&T has indicated that it intends to provide regular commercial service based on BQM technology.

Analysis

What is BQM good for? The intended target can be characterized as follows:

- Transaction processing of all types. Given a quality and tightly managed hardware environment, BQM can support, in distributed fashion, the fast transaction processing needed in applications such as credit card validation or securities markets. BQM is also often used, for the ease of development it supports, in traditional centralized transaction processing.

Applications that require coordinated processing but can tolerate the delays and interruptions of the typical distributed environment. Perhaps BQM's key strength is its ability to support transaction and other critical applications in a general-purpose environment where high service levels cannot be guaranteed by the hardware or communications subsystems.

- Event-driven applications where information transfers cannot be pre-scheduled.
- Applications distributed across heterogeneous platforms, but only to the extent that multi-platform

The BQM Forum expedites the development of reliable, off-the-shelf business applications. Microsoft has common goals in this area, and has been a BQM board member since the Forum began.

N-tier computing requires a flexible and well-integrated platform for easier development of distributed applications. The Microsoft Windows NT operating system meets these requirements with COM, Microsoft Transaction Server (MTS), Internet Information Server (IIS) and Microsoft Message Queue (MSMQ) services, as well as its integration with development tools. MSMQ provides queuing services and asynchronous, guaranteed communications, as well as strong interoperability with existing systems.

The combination of MSMQ with the other Windows NT services allows developers to easily integrate applications, take advantage of transactional services, implement a push-style business-event delivery environment, and build reliable applications that work over unreliable networks. Joining applications on different platforms using the Level 8 family of products completes Microsoft's strong messaging story with interoperability to platforms other than Windows.

MSMQ is an integral element of Microsoft's Windows DNA architecture, as many enterprise environments need the combination of communication styles and integration of services and tools which the Microsoft platform provides. Due to MSMQ's critical role in middleware services, Microsoft supports the Forum and its initiatives.



products or truly effective bridging solutions are available.

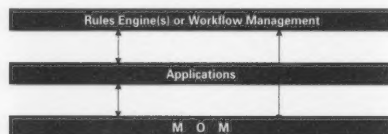
- Legacy applications. According to Craggs at Candle, this is currently a principal use for BQM. BQM makes it possible with minimal pain to transform a set of separate batch applications into a single distributed solution. Some examples include:

Order entry/processing where multiple resources are called into play, but where fulfillment is not expected to occur in realtime.

Back-end support for Web-based applications in electronic commerce.

WORKFLOW AND BQM

FIGURE 4



Banking applications where transaction completion can and does take place at slower than realtime speeds. The SWIFT interbank organization is looking at BQM for its next generation network.

Future applications

Even though BQM was aimed at specific applications does not mean that it cannot be used elsewhere. To begin with, the ready-made infrastructure and high

service quality provided by BQM could make it attractive for applications at the high-speed end or low-speed batch end of the spectrum. For example, BQM could provide an attractive platform for EDI.

Workflow may benefit too. IBM's Colin Osborne notes that a rules engine or workflow manager could drive a MOM environment, resulting in the architecture of Fig. 4. Not so strange when one realizes that workflow is really distributed transactions with humans in the loop.

If it looks like e-mail and quacks like e-mail, but sounds better, what is it? Can you do plain vanilla messaging over BQM? Could you, for example, move MIME traffic through a BQM environment? Using ordinary clients? The answer is yes, with adaptation in some cases, but the adaptation should be minimal.

For example, MSMQ can be run as a MAPI accessible service. That means you could use ordinary mail clients right now with MSMQ. Pete Houston of Microsoft points out that MAPI doesn't support distributed transactions, and that in any case MSMQ is not intended as a substitute for Exchange. We would expect a similar answer from IBM with regard to MQSeries vs. Notes Mail.

But wouldn't a corporation moving increasingly important traffic electronically be interested in BQM? We're in a progression in messaging, suggested by Fig. 5, from "light-duty" text-only traffic toward the movement of objects, which, because of their size, complexity and business importance, can be considered "heavy." Heavy-duty messaging will continue to

COMPUTERWORLD

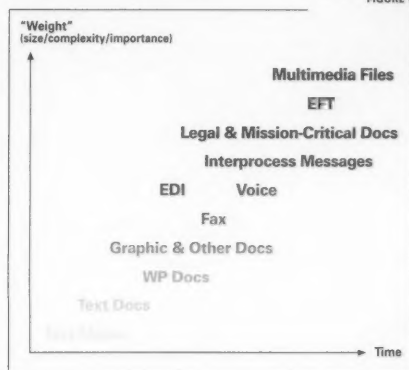
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HEAVY DUTY MESSAGING

FIGURE 5



become attractive to the business community, as the building blocks are put in place to make it feasible.

We expect the demand for truly industrial strength solutions to increase. This could be viewed as putting the vendors in a classic "cannibal" dilemma. Selling BQM solutions for ordinary messaging would cut into the market for mainstream products. However, we think this problem quite likely will be forestalled by building the quality provisions of BQM into future generations of those very products. This is not to say that today's messaging products are bad, just that BQM represents a heavy engineering investment in producing something even better.

In fact, with the benefit of hindsight, it's amazing this hasn't happened sooner. How could we have tolerated for so many years the QOS provided by SMTP (or even the somewhat more robust P1 protocol of X.400)? Neither standard provides anything like the end-to-end

guarantees of BQM. Most likely the answer lies in the casual back-door route, through which messaging first found its way into the corporate environment.

That brings up the issue of public e-mail on the Internet. There are obvious cost and logistic concerns in the way of a widespread upgrade. On the other hand, we're hearing of failure rates as high as 4% for Internet messaging traffic. This may be tolerable to individual users who regard e-mail as "free," but Internet mail is also used widely for intercorporate traffic, and as the primary messaging source for many smaller companies. Neither of these constituencies can tolerate failure rates at those levels in the movement of business-critical traffic. From this perspective, a possible outcome, anticipated by the AT&T demonstration, would be the emergence of a two-tiered service, with business-class messaging for the business community and economy for everyone else.

About the author:

Theodore H. Myer has been active in messaging R&D since the early 1970s. His focus on messaging and information transfer includes work with key standards development groups, including ITU Rapporteur Groups; ANSI X12 Committee; North American Directory Forum and the Electronic Messaging Association (EMA). He is the 1998 recipient of the EMA's Lifetime Achievement Award.

The Burton Group is a network planning services company specializing in distributed computing technologies. Through its advisory services, The Burton Group empowers IT professionals, enabling them to make strategic decisions regarding network technology. The Network Strategy Service consists of research and analysis of complex network computing technologies. The company provides consulting and education services in the areas of electronic messaging, directory services, groupware and other Internet/intranet-based applications. The company's annual Burton Group Catalyst Conference provides a forum for network users and vendors to address network computing issues. For more information, visit www.tbgroup.com.

See SAP interconnection over the Internet using BQM technology. Also, you're invited to attend the BQM Forum meeting and reception on Monday, September 14 at the Marriott Hotel at the Los Angeles Convention Center. Please visit www.bqm.org for more information.

B U S I N E S S Q U A L I T Y M E S S A G I N G

Industrial-Strength IP to Connect Applications and Companies

Business Quality Messaging (BQM) is message queuing technology that allows commercial, off-the-shelf applications to exchange information reliably over corporate networks. Specifically, BQM provides a business-grade quality of service that is considerably higher than what is found in ordinary messaging, and is in fact high enough to support mission-critical distributed processing.

The BQM Forum was founded in April 1997 by AT&T, Compaq, IBM, Intel, Microsoft and other companies to develop and promote messaging-oriented middleware for volume

enterprise applications. Today BQM technology is found in products from IBM, Microsoft and nearly a dozen other vendors.

Join the BQM Forum. The BQM Forum is the focal point for system integrators, corporate IT developers, ISVs, VANs and ISPs who use message queuing technology to integrate applications. The Forum meets quarterly and also will participate in several shows in 1998-99. Several Forum members have begun to showcase their BQM-enabled solutions. Visit the BQM events calendar to register for an upcoming event or get more information: www.bqm.org.



Streamlining the Data Warehousing Process with

Packaged Data Marts

By Henry Morris
International Data Corp.

Data Warehousing as a Process

Data warehousing is a *process* that organizes time-based data coming from multiple applications according to subjects meaningful to decision makers in a business. IDC measures the market for data warehousing software tools at \$2.5 billion in 1997, and forecasts the market to grow to over \$8 billion by the year 2002. There are two obvious reasons for this growth:

- ☐ Businesses are investing in data warehousing because access to accurate information is a competitive necessity. Data warehouses make information available to business users in a form that is easier for them to understand and more rapidly act upon.
- ☐ IT is investing in data warehousing software tools in order to automate the steps in the data warehousing process, thereby reducing the time and risk of implementation.



Graphics courtesy of IBM Corp.

IDC divides the data warehousing process into three phases: warehouse generation, warehouse management and information access (Fig. 1). So far, data warehousing tools have automated tasks in *one* of these three phases:

Warehouse generation

Data from one or more production applications or external sources must be mapped to a unified model designed for the data warehouse. Software tools automate the design, extraction, cleansing, transformation and loading operations.

Warehouse management

Data is stored in a form optimized for user access, in a relational and/or multi-dimensional database. Software tools support storing the data, tracking the type and volume of access, managing multiple user views and queries, tuning the database for performance and ensuring its availability.

Information access

Data is accessed by end users according to a business level view of the information. Software tools support a range of access for different levels of users from query and reporting to multi-dimensional analysis.

Populating the warehouse and ensuring performance of the warehouse to meet user needs are the main challenges for IT managers in implementing and maintaining a data warehouse. Difficulties in implementing

data warehouses stem from the difficulty in linking the tools used to automate the steps of the process (moving/transforming data to the warehouse, managing the data and accessing the data). Across all these steps, consistent data definitions or metadata must be maintained. One approach—automating the process via packaged data marts—has the potential to reduce the risks and time of data warehouse implementations (a concept first presented by IDC in a 1997 bulletin, *Packaging the Data Mart: The Application-Centered Data Warehouse Emerges*).

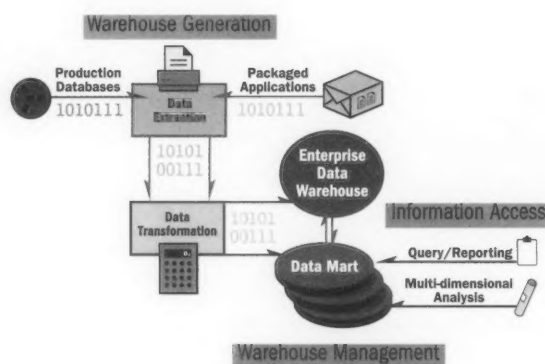
Packaged Data Marts

A packaged data mart is an integrated software product that brings together software tools to automate multiple phases of the data warehouse process. More than a bundle of products, a packaged data mart integrates the flow of data from one tool to another, from one task to another. The latest packaged data marts integrate tasks across the three phases of warehouse generation, warehouse management and information access.

Customers who purchase packaged data marts are able to rely on a single vendor for the integration of software components, rather than performing the task in-house. The benefit increases in time, as the vendor takes responsibility for providing new releases of the integrated whole, rather than leaving the customer to coordinate separate releases of

Figure 1. The Data Warehousing Process

Source: International Data Corp., 1998



separate products from multiple vendors.

This packaging and integration concept can be taken a step further when the integrated toolset is given an application focus. A packaged data mart can be enhanced to incorporate content, i.e., models specific to an application area such as HR or marketing. An application-specific packaged data mart is a collaborative effort between the provider of an integrated toolset and an application company with specialized domain expertise.

Will IT buyers accept packaged data marts? Packaged data marts are relatively new to the marketplace, and IDC sought to measure the potential demand for these packages. In a recent survey, IDC asked over 800 IT managers in the U.S. about their interest in

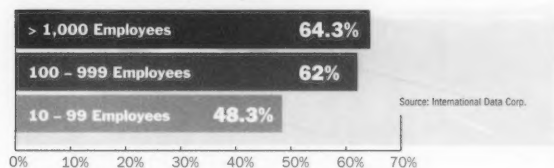
packaged data warehousing solutions organized around strategic applications. The response was strong among all companies, but especially among medium-sized to large companies where the adoption of data warehousing is highest (Fig 2). Organizations that have directly experienced the complexity of the data warehousing implementation process appreciate the value of integrated solutions that automate tasks across that process.

Packaged data marts offer many benefits, but there are also risks. If a business introduces a successful data mart (to meet the needs of a department or specific application), there will be interest in tackling an additional problem with a second data mart. This is a critical point. Common concepts and business dimensions across the marts must be defined in a consistent way and kept in a single physical or logical metadata store. Ideally, the broad outlines of the dimensional model are established at the beginning of the process as part of the initial data mart imple-

About the author

Henry Morris directs research on data warehousing software at International Data Corp., a worldwide research firm headquartered in Framingham, Mass. He has written extensively on the relationship between packaged applications and data warehousing, the definition of the analytic applications market, and the role of closed loop systems. Dr. Morris analyzes the emerging alliances of software vendors in related segments by building models such as the application ecosystem and vertical warehouse. He can be reached at hmorris@idc.com.

Figure 2. A survey of over 800 IT managers revealed that interest in packaged data warehousing solutions is strongest among mid-sized and large companies.



mentation. Careful planning, usually with the help of consultants, is vital in bringing discipline to this design and modeling process.

Although different organizations may have different initial objectives for data warehousing, the end products (enterprise data warehouse and data marts) are complementary. Over time, organizations will implement both enterprise warehouses and user group-specific data marts. More organizations today are proceeding bottom-up (from marts to an enterprise warehouse) than top-down (from an enterprise warehouse to data marts).

Return on Investment and Data Marts

Can packaged data marts bring more rapid return to organizations moving to data warehousing? There are two important ways in which packaged data marts reduce complexity, contributing to more rapid return.

- ☒ **Packaged data marts:** The data mart approach, responding to a specific business imperative, provides a clear target for the initial data warehousing implementation.

Too many IT projects suffer from "scope creep," lengthening implementation cycles and increasing the risk of failure. IDC's *Foundations of Wisdom: A Study of the Financial Impact of Data Warehousing* found that organizations that focused initially on building a single subject, "discrete" data warehouse (essentially a data mart) paid back the investment in 0.94 years. The contrasting "enterprise" approach, where organizations initially built a broad data warehouse in support of a range of business processes and user constituencies, had a payback period that was twice as long — 1.91 years.

- ☒ **Packaged data marts:** There is value in the integration provided by integrating tools that support tasks across the data warehousing process.

When the IDC financial impact study was done (1996), packaged data marts had not yet come on the market. Due to their reduced scope, data marts are more amenable to packaging than enterprise warehouses. The same study showed that the initial and ongoing 3-year costs for the discrete approach were only slightly lower than the enterprise approach. Packaged data marts, in which a single vendor takes responsibility for tool integration, have the potential to drive down implementation costs significantly, further — and substantially — improving return on investment.

Conclusion

Data warehousing is a process whose goal is to provide better access to business information, meeting the needs of decision makers. Packaged data marts streamline the data warehousing process, integrating tools in support of multiple tasks: from warehouse generation to warehouse management to information access. Organizations stand to benefit by reducing the risk and potentially the cost of data warehousing implementation. ☺

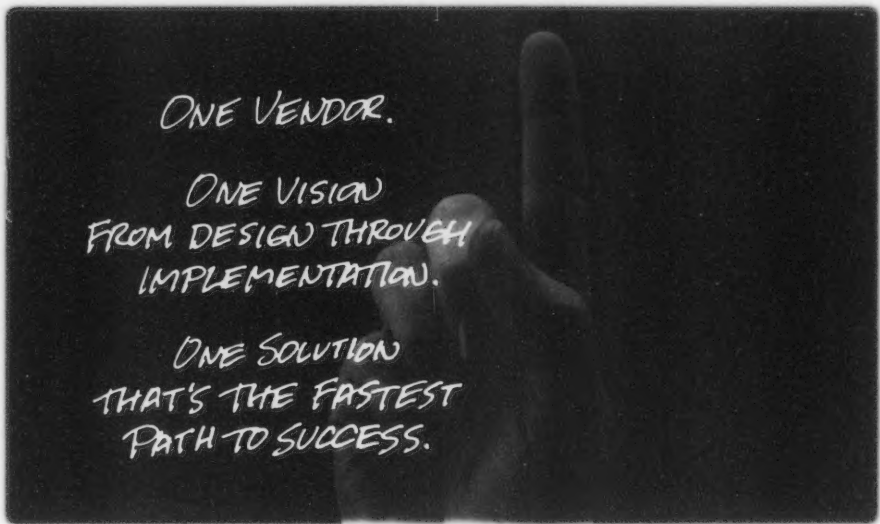
Packaged Data Marts

Sagent Technology provides packaged data mart offerings for organizations that want to "build" their own solutions, as well as for organizations looking to "buy" solutions. For the "build" option, Sagent offers a combination of best-of-breed products and comprehensive services to speed the implementation time for deploying data mart-based applications to the Web. Sagent's products deliver capabilities for building data marts, as well as giving end users Web access to data. Sagent's professional services deliver the technical expertise needed to successfully implement Star Schema-based data marts.

For those organizations looking to "buy" packaged data marts, Sagent teams with leading application vendors to deliver focused solutions. Sagent's partners include Siebel Systems for sales and marketing, ADP for human resources and Advent Software for portfolio management. Each of these partners uses Sagent's products to load operational data into a pre-defined data mart and then deliver data to end users for more effective decision making.

This sidebar was created by Sagent Technology.





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SPECIAL REPORT ERP

UNIVERSE



tionship management have become the newest mantras," Bermudez says. "That includes sales force automation, customer support, call centers and field service. There's even Web site management — making the most of the people who visit your Web site by tracking what they look at. ERP is going to be very successful here."

As ERP targets outward-looking processes, customers are evolving along with it. Datex-Ohmeda, for example, bought MFG/PRO from QAD, Inc. in Carpinteria, Calif., in 1990 simply to replace a variety of aging, high-maintenance systems in factories and distribution centers around the world. "We were looking at something broken and trying to fix it," says Tim Wing, information technology director at the billion-dollar international pharmaceuticals manufacturer.

But MFG/PRO facilitated the evolution of Datex's manufacturing systems from traditional to just-in-time processes, and that started an evolution to other outward-looking processes. "We began to get a little clever about how to perform true enterprise activities," Wing says, "so a sales order in one country would move to a plant in another for shipment to another." Now the ERP system supports internal processes such as manufacturing and finance, as well as outward-looking processes such as sales, order processing, distribution, field service, global supply chain and quality control. "The system is now pervasive throughout the business," Wing says.

MIDMARKET FOCUS

About 18 months ago, Atco Rubber Products, Inc., a \$150 million manufacturer in Fort Worth, Texas, implemented ERP software for financials and distribution management from Platinum Technology, Inc. in Oakbrook Terrace, Ill. The norm for smaller

companies at the time was to go with smaller vendors, and Paul Evans, manager of information and planning, says he didn't give much thought to the bigger players, mostly because "they're a lot more expensive."

But today, Atco might be courted by SAP, Baan and PeopleSoft, Inc. Big vendors are moving into the midlevel and lower-midlevel market of companies with annual revenues of less than \$250 million, and they're cutting deals to make their products more affordable, says Trisha Tubbs, manager of SoftResources LLC, a Seattle consulting firm. "I've seen Baan moving down to a company with \$15 million in revenues," she says. "And PeopleSoft actually is pricing according to customer revenues to get down to smaller companies."

A look at SAP's World Wide Web site confirms this. "It's not size that defines our customers," declares a banner atop the home page, followed by descriptions of customers in the \$150 million to \$400 million range. "It's success," the kicker reads.

ONE VENDOR

In the past, large companies sometimes bolted together combinations of ERP products from different vendors. Although

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Facts, figures & functions

Status check

In June and July, the Computerworld Information Management Group surveyed 102 IT sites that are using or planning to use ERP software.

The results:

- 35% are in the planning or pilot stages,
- just over 60% report progress ranging from a few modules in production to full companywide use.



Top 5 benefits already realized:

1. Better or more integrated systems architectures
2. Better information flow or data quality
3. Better manufacturing production or inventory management
4. Lower costs
5. Corporate re-engineering/restructuring

Top 5 expected benefits during next two years:

1. Better manufacturing production or inventory management
2. Better information flow or data quality
3. Better or more integration of systems architectures
4. Lower costs
5. Corporate re-engineering/restructuring

GREATEST CHALLENGES IN AN ERP PROJECT*

	MENTIONS
Getting end-user buy-in	22
Scheduling/planning	15
Integrating legacy systems/data	14
Getting management buy-in	13
Dealing with multiple/international sites and partners	12
Changing culture/mind-sets	11
IT training	11
Getting, keeping IT staff	11
Moving to a new platform	10
Performance/system upgrades	8
Integrating ERP modules/products	6
Costs	6

* Respondents could name one technical challenge and one management challenge

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SEMINAR

Managing Enterprise Architecture Planning: Enterprise Modeling for Business, Data, Applications and Technology
Chicago, Oct. 27-29 (Oct. 26 Management Overview)
Contact: DCI, (978) 470-3880



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AN EXPANDING UNIVERSE

CONTINUED FROM PAGE 57

Bermudez says he doesn't think that ever was a "conscious plan," big corporations put in packaged financial systems first because there was a higher degree of standardization among financial users than manufacturing users. Later, they added different ERP systems for manufacturing. Other companies grew by acquisition and bolted the ERP systems together, he says.

But today, there is a strong trend toward using just a single ERP vendor.

"We're seeing a strong drive to make one vendor the primary vendor," agrees Byron Miller, vice president of Giga Information Group in Cambridge, Mass. "Some businesses are becoming very, very dogmatic in taking this approach."

The one-vendor approach was essential for Manufacturers' Services. "Our strategy was to have one ERP for the entire company," Walshe says. Otherwise, he'd never get the "common view" necessary to serve customers efficiently.

CONFORMITY IS OUT

Users are more likely to have a primary ERP vendor, but they're less likely to accept the demand that all their processes conform to the ERP model. When Andy Hafer, technology chief at Hydro Agri North America, Inc., implemented SAP's R/3 in 1994, he began a years-long struggle for alignment. "We've been fighting against the integration SAP provides because some of our business processes don't match up," he says.

But trying to change Hydro Agri's processes to fit the SAP mold has brought a lot of pain and fewer benefits to the \$800 million Tampa, Fla.-based agricultural products manufacturer, Hafer says. Recently, he's come to a new understanding. "We're finally realizing that SAP is not going to fit every single instance," he says. When Hydro Agri's processes clash with SAP's, "we'll build a different front end or bolt on a different type of package," Hafer says.

That's getting easier by the day because of the recent boom in add-ons or bolt-ons, which are

specialty software components that fill the gaps where particular vertical markets or companies have processes that don't fit the ERP common denominator. "There's a whole new industry of SAP partners," Hafer says. "You can almost find something for anything. I want to use SAP as an infrastructure and backbone and attach other [bolt-on] appendages."

Bolt-ons are expanding the

terfaced it to PeopleSoft, and it's working very well."

The big issue with add-ons is the extent to which they are preintegrated with your ERP system. Some come with most of the integration work already done. SAP and Oracle, for example, have partner programs that provide certified, preintegrated add-ons, says Scott Lundstrom, an analyst at AMR. "Those are pretty easy to plug in," he says.

Bolt-ons are expanding the ERP universe faster than the big vendors could do it alone.

ERP universe faster than the big vendors could do it alone. Charlie Lacefield, vice president of business process and information technology at Dow Corning Corp., a 50/50 venture between Dow Chemical and Corning, Inc. in Midland, Mich., is using the total suite of SAP R/3 but also is looking at enterprise relationship management add-ons from Siebel Systems, Inc. in San Mateo, Calif.

"Those are management and decision-support systems," Lacefield says. For example, one helps executives determine whether to move forward on new products or opportunities for business expansion. "It's going to take both [transactional and analytical capabilities] to do a really top-notch job in leading a corporation," he says.

On the other hand, Corning Corp. is using third-party products to address unique but non-mission-critical processes such as time and attendance. "Corning has a complex union environment with complex pay rules," explains Steve Cooper, director of enterprise systems at the Corning, N.Y., specialty-glass maker. "We needed a little more sophistication and function, so we acquired the product and in-

Still, says Miller, "We do not have anything that approaches a plug-and-play system."

Other modules truly are bolt-ons, requiring a great deal of integration work. "Depending on the application, it can be a pretty big deal," Lundstrom says.

TOMORROW'S ERP

What does ERP's future look like? It will probably include the following:

- Single backbones with add-on components from vendors and their partners.
- Attention to processes that don't fit the common mold.
- A focus on outward-looking processes such as customer support and analytical processes such as decision support.
- A vendor focus on smaller companies.

Technology, customer business strategy and vendor marketing all seem to be converging on one goal: expanding the ERP universe. "The mandate that CIOs are giving leading ERP vendors is that we're committed to you as a single vendor," Bermudez says. "Now we want you to do everything." □

Melymuka is Computerworld's senior editor, management.



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COMPUTERWORLD

(www.computerworld.com) September 14, 1998 Computerworld

ERP

DEFINITION: Enterprise resource planning (ERP) software is a set of applications that automate finance and human resources departments and help manufacturers handle jobs such as order processing and production scheduling. ERP systems such as SAP AG's R/3 are notoriously complex, and installing the software often forces users to change their internal processes. ERP vendors are branching out into applications such as supply-chain management and sales force automation, but whether those functions fit under the ERP banner is debatable.

HOT TRENDS & TECHNOLOGIES IN BRIEF

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CONCEIVABLE COMPONENTS FOR ERP SYSTEMS

Finance

Modules for bookkeeping and making sure the bills are paid on time.

Examples:

- **General ledger** - Keeps centralized charts of accounts and corporate financial balances.
- **Accounts receivable** - Tracks payments due to a company from its customers.
- **Accounts payable** - Schedules bill payments to suppliers and distributors.
- **Fixed assets** - Manages depreciation and other costs associated with tangible assets such as buildings, property and equipment.
- **Treasury management** - Monitors and analyzes cash holdings, financial deals and investment risks.
- **Cost control** - Analyzes corporate costs related to overhead, products and manufacturing orders.

Human Resources

Software for handling personnel-related tasks for corporate managers and individual employees.

Examples:

- **Human resources administration** - Automates personnel management processes including recruitment, business travel and vacation allotments.
- **Payroll** - Handles accounting and preparation of checks related to employee salaries, wages and bonuses.
- **Self-service HR** - Lets workers change their personal information and benefit allocations online without having to send forms to human resources.

Manufacturing and Logistics

A group of applications for planning production, taking orders and delivering products to the customer.

Examples:

- **Production planning** - Performs capacity planning and creates a daily production schedule for a company's manufacturing plants.
- **Materials management** - Controls purchasing of raw materials needed to build products. Manages inventory stocks.
- **Order entry and processing** - Automates the data entry process of customer orders and keeps track of the status of orders.
- **Warehouse management** - Maintains records of warehoused goods and processes movement of products through warehouses.
- **Transportation management** - Arranges, schedules and monitors delivery of products to customers via trucks, trains and other vehicles.
- **Project management** - Monitors costs and work schedules on a project-by-project basis.
- **Plant maintenance** - Sets plans and oversees upkeep of internal facilities.
- **Customer service management** - Administers installed-base service agreements and checks contracts and warranties when customers call for help.

Transaction Engine

Core software that manages the flow of transactions among applications and handles tasks such as security and data integrity.

New applications targeted by ERP vendors

Data Analysis

Decision-support software that lets senior executives and other users analyze transaction data to track business performance.

Supply-Chain Management

Advanced planning applications that take into account production constraints, demand forecasting and order delivery promises.

Front-Office Applications

Sales force automation, telemarketing and call center support software for use in dealing directly with customers.

Facts, figures & resources

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Related ERP terms

Activities based costing

A form of accounting that tries to quantify the true cost of each part of a business process. For manufacturers, it could be an alternative to setting annual standard production costs.

Capacity planning

The constant manufacturing of goods. It allows the manufacturer to work to nearly full capacity without peaks and valleys in the workload.

Cost center accounting

Process of assigning overhead costs to different business units. Overhead includes salaries, building maintenance and other costs that aren't directly related to manufacturing goods.

Fixed assets

Includes buildings, furniture, machinery, vehicles and other physical property that needs to be tracked for purposes such as depreciation and maintenance.

Just-in-time manufacturing

Having materials brought to the factory as they are needed instead of keeping them in stock. Its purpose is to cut waste.

Logistics management

Managing the operations of manufacturing such as distribution, plant scheduling and transportation.

Manufacturing resource planning (MRP II)

Coordinating the manufacturing process. It allows a variety of functions such as planning, production, distribution and scheduling to be linked together.

Supply-chain management

Managing supply and demand along with ordering, manufacturing, warehousing, inventory-tracking and distribution of a product.

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THE ART OF DATA MANAGEMENT

SOUNDOFF

IS ERP IN TROUBLE?



Of course it is.
By Bobby Cameron

It isn't that the big vendors will die or that all their products no longer meet users' needs. The problem comes when manufacturing companies expect their investments in enterprise resource planning (ERP) suites to set them

up to attack new markets and business opportunities, such as Internet commerce. They dream of systems that improve their coordination across internal activities, suppliers and customers — with big payoffs in efficiency and competitive position.

Guess what? ERP falls far short of those expectations, regardless of the big vendors' marketing claims. ERP suites excel at combining financial control with multiplant manufacturing coordination, but users need more to realize their dreams. They need extended supply-chain planning and flexible execution that can implement one business process today but change rapidly to handle tomorrow's new models.

ERP's main functional weakness is in the planning functions — master production scheduling and manufacturing resource planning (MRP) modules that decide how and when to respond to customer demand with available resources. The modules

can't support a real-world supply chain. They deliver the following:

Transactions — without responsiveness. Responding to changes in demand, supply, available labor or machine capacity requires quick thinking, which isn't ERP's forte. Plant schedulers and planners make those decisions in their heads or resort to spreadsheets and the backs of envelopes. Based on incomplete analysis, they commit the plant to unrealistic customer shipment dates, which results in unreliable promises and annoyed customers.

Production focus — without understanding demand. ERP systems treat demand forecasts as external inputs but fail to resolve often divergent sales projections of marketing, operations and sales management. Production plans driven by inaccurate forecasts can result in dramatic shortages and overages.

Control — without intelligence. ERP systems let companies institute

radical business process change. But they make dumb decisions. For instance, MRP schedules material requirements based on the assumption of unlimited plant capacity. The result is inventory excess or shortfalls at each stage in the process.

Span — without alignment. Integrated ERP packages let a company tie together multiple plants and distribution facilities from an organizational and inventory perspective. But ERP can't view plants as substitutes for one another, even if they make the same product. So leveraging resources across plants and distribution facilities is a manual process.

As for flexibility, almost all ERP suites were designed to operate in an over-the-wall fashion. Such stovepipe logistics can't adequately react to changes in customer demand.

Moreover, at each handoff between applications, increased uncertainty leads to overstocked inventories, longer wait time and slower response. And things will get worse as the Internet economy drives a business revolution that Forrester Research, Inc. calls "dynamic trade" — the satisfaction of current demand with custom response.

In a dynamic trade environment, the following things happen: **Services eclipse products.** Companies use services such as vendor-managed

inventory and direct store delivery; that requires on-the-fly business process change.

Demand drives production. Companies are moving to make-to-order and late-assembly strategies.

Price matches market conditions. Businesses reduce inventory to maximize profits in commodity or supply-driven markets.

The key to dynamic trade is agility. And that's where ERP stumbles.

So what should you do with ERP suites? Buy them if you need them, but only if they deliver known business value, such as collecting information needed for dynamic trade or fixing year 2000 and euro problems.

Otherwise, turn outward: Deploy extended supply-chain, Internet commerce and customer management solutions to position yourself for the world of dynamic trade.

And to do any of that correctly, you must adopt a component application strategy, buying solutions from multiple suppliers. But that's another conversation. □

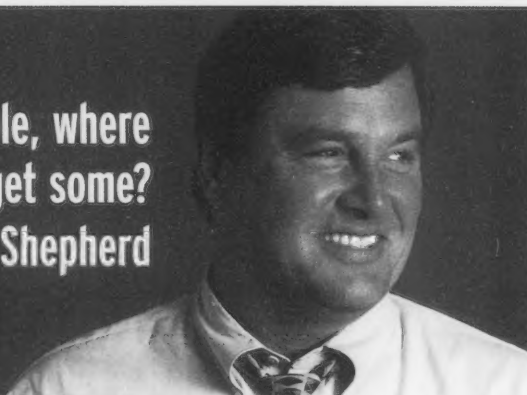
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ERP isn't flexible
enough for today's
markets.

SPECIAL REPORT ERP

If this is trouble, where
can I get some?

By Jim Shepherd



STELLA JOHNSON

How can anyone claim that ERP applications are in trouble? We're in the midst of one of those rare situations in which customers' desires and vendors' offerings have converged. The result is a

booming market that shows no sign of abating.

In the past three years, the enterprise resource planning (ERP) market has grown at a compound annual rate of 35%. What other \$15 billion industry can match that?

In the manufacturing industries, it's virtually impossible to compete effectively without a comprehensive set of highly integrated business applications. The growth of ERP is a direct result of the fierce global competition, short product life cycles, highly distributed operations and information-driven management that characterize today's manufacturing environment.

Let's look at the alternatives to see if they are a real threat to ERP suites.

One option is the best-of-breed approach, where a company selects several applications from various specialist vendors and attempts to assemble its own system. But whoa there: Businesses that try this approach find that not only are the initial license fees higher, but that the integration and implementation costs are also typically several times more expensive. The architectures of the individual applications are different, the user interfaces are inconsistent, the data models overlap. It's a big labor-intensive mess. Companies may spend months just trying to reconcile vital data fields.

If the system *does* get implemented,

the information systems department lives in terror of each new product release, wondering which interface will break this time. Then, of course, there's the ongoing support nightmare that inevitably crops up when each vendor claims that the problem must be in the other vendor's software.

Another alternative to purchasing a prepackaged ERP suite is to hire a systems integrator to assemble a custom system from component products. This is simply best-of-breed with a general contractor. Systems integrators can't fill the roles of software companies. They can assemble onetime solutions, but they can't provide the critical product support, training or enhancement releases you need.

The argument that ERP is on its deathbed is inevitably led by technologists who would once again have you believe that building your own system is easy. There's always a technology "breakthrough" that makes it possible, they promise. Yeah, right.

Even if it were feasible to assemble a custom system, most buyers wouldn't want to. The vast majority of companies have always hoped to purchase an information system as a product, not as a collection of technologies, components and services. The ERP vendors have been successful precisely because they are attempting to build such a product. A typical ERP system

now offers broad functional coverage; vertical industry extensions; a robust technical architecture; training, documentation, implementation and process design tools; product enhancements; global support and an extensive list of software, services and technology partners. It isn't quite a system-in-a-box, but it's closer than we have ever been before.

ERP will continue to succeed because most people prefer to buy products rather than parts.

The concept is so compelling that it's rapidly expanding beyond its manufacturing roots into industries such as retail, utilities, financial services, education — even government. As these industries struggle with the year 2000 problems in their custom systems, they begin to appreciate the benefits of buying packaged suites from vendors that will support and enhance the applications. Recognizing this opportunity, most major ERP vendors are repackaging their products for vertical industries.

ERP vendors have extraordinary opportunities for growth. They can sell additional applications and seats to their installed bases. They can sell new systems into their traditional industry and geographic markets. They can expand into new verticals, add new applications or increase their geographic coverage. ERP in trouble? ERP is poised for enormous growth. □

Shepherd is vice president of research at AMR Research, Inc. in Boston. His Internet address is jshpherd@amrresearch.com.

Facts, figures & functions

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SAP Documentation and Training Development Guide

By Kathryn E. Park (Bobkat Press, Sweeny, Texas; 1997)

SAP R/3 Business Blueprint: Understanding the Business Process Reference Model

By Thomas Curran, Gerhard Keller and Andrew Ladd (Prentice Hall Professional Technical Reference, Upper Saddle River, N.J.; 1997)
(www.phpt.com)

Special Edition Using SAP R/3: The Most Complete Reference

By ASAP World Consultancy, Gray Elkington and Jonathan Blain (Que Education and Training, New York; 1997)
(www.mcp.com/mcp_publishers/que)

Manufacturing Planning and Control: Beyond MRP II

By Paul Higgins, Liam Tierney and P. Le Roy (Kluwer Academic Publishers; Dordrecht, The Netherlands; 1996)
(www.wkap.nl)



ERP isn't quite a
system-in-a-box,
but it's closer
than we've ever
been before.

INSTEAD OF THE PERFECT PRODUCT, HOW ABOUT THE PERFECT SUPPLIER?

PETER G. W. KEEN



The entire IT field is product-centered. It ought to be supplier-obsessed instead.

Most people will take "good enough" over "perfect" if it comes from a vendor they trust. Look at the annual articles on the perfect PC put out by the trade press: Would you buy one of those wonder machines? The answer is probably not; they rarely match up with a vendor you'd want to have sell and support it.

The product era is basically over in most areas of IT — not just PCs. Customers have at least several good choices, and no one vendor can completely dominate a market. That's true in ERP, with vendors such as Baan, J. D. Edwards, PeopleSoft, SAP and Oracle, among others, offering a broad shelf of choices. There are good choices, too, in databases, PCs, switches, wireless infrastructures and systems integration. It's not that products don't matter, but that the differentiation among top-tier providers lies elsewhere. Here's my list of what must apply to products and services in ERP or any other technology:

1. KEEPING PROMISES: Truth in advertising, partnership and support. When IS picks a "strategic" vendor, it's really placing a bet on a large part of its own future flexibility, costs, efficiency and service. It isn't asking for the perfect product, but the best relationship, commitment and meeting of promises. So the perfect vendor has a proven record in meeting promises. Terms such as *brochureware* and *vaporware* are signals that IT promises are too often of the piecrust sort: easily made and easily broken.

2. EXPERT ON-SITE SUPPORT ON DEMAND: This may have been IBM's single greatest differentiation when it lacked a product edge. It was a differentiation for the excellent Digital Equipment Corp. of the 1970s, too. Given the complexity of the enterprise telecommunications, database and computing infrastructures of today, it's a sorely missed need that will take on new importance in sorting out the best vendors from the average.

3. SCALABILITY: Scalability has replaced compatibility and interoperability as a criterion for best vs. average. Scalability is essential in an era in which prototypes and pilots can easily be built on a variety of mini-platforms — intranets, data marts, electronic-commerce Web sites and the like — but they don't scale. My favorite examples have long been the

Lotus Notes-based knowledge management efforts that are one-server triumphs. When the firm scaled up to a few thousand servers, you could watch the network die.

4. PARTNERS: No IT provider can go it alone now. If you can't show you have a portfolio of partner relationships across the enterprise spectrum, forget about ever being a top-tier player in the long run. Here are just a few comments I've heard from executives at leading Silicon Valley firms, comments I completely endorse: "People are kidding themselves if they don't have strong partners"; "Ally or die — you have to have good partners with you"; "Any software company has to find a middleware partner"; and "Your competitor is also your partner. Otherwise, you expose weaknesses in the architecture."

5. FIT WITH THE EMERGING MAINSTREAM: You can't be just a database software provider or an electronic-commerce Web player or a wireless provider. You have to be able to move with and within all the main flows of IT — all of them. You can't be the old Wang Labs, which had superb products but was out of the telecommunications mainstream, or a Motorola, once the leader for a decade in the analog product mainstream but now struggling to get back in the digital wireless flow.

I started this article by stressing the perfect vendor rather than the perfect PC product. Let me end by rephrasing my title: "IS professionals talk about the perfect system. How about the perfect IS organization?" The customers of IS see it as a vendor; the outsourcing business rests on substituting a commercial vendor for an internal one.

The perfect IS unit is also marked by its record of truth, its expert on-site support on demand, its scalability, its partnership portfolio and its fit with the emerging mainstream. If it has all those, it will find its products easily from the perfect vendors. It will become the preferred supplier to the business, regardless of product.

And it will be as customer-obsessed as it wishes its own suppliers would be. □

Keen's book *The Business Internet and Intranets* was published in February by Harvard Business School Press. He can be reached at peter@peterkeen.com.

Facts, figures & functions

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The ERP market

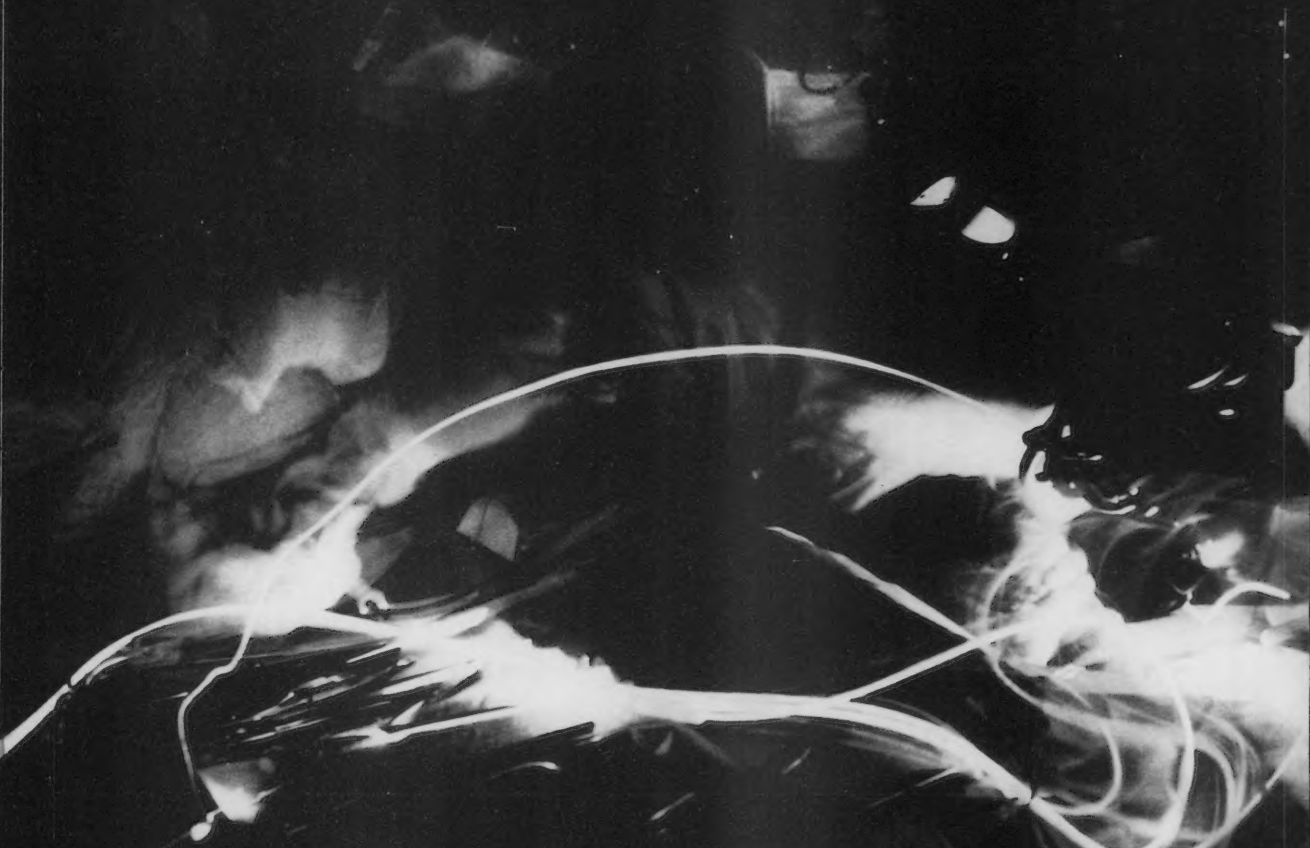
•From Advanced Manufacturing Research, August 1998:

The ERP market will climb from \$14.8 billion this year to \$52 billion in 2002, for a compound annual growth rate of 37% during the five years. The vendors in the ERP market are segmenting into two tiers and are focusing on expanded product functionality, new target markets and higher penetration rates. The top tier consists of five vendors — Baan, J. D. Edwards, Oracle Applications, PeopleSoft and SAP. These companies account for 64% of the ERP market revenue and have grown during the past year at a furious pace of 61%. In addition, Baan, J. D. Edwards, Oracle and PeopleSoft are each expected to approach or exceed \$1 billion in total revenue this year, while SAP will approach \$5 billion.



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When it's life or death, U S WEST understands a 51 millisecond delay is too long.



Right now, a surgeon in another state is making a diagnosis on this patient based on the transmission of real-time images of microsurgery. It is called telemedicine and it's made possible by U S WEST's Synchronous Optical Network (SONET) technology.

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Farmland's Dick Weaver: "I've got two things I'd like SAP to do faster: bring out a more robust set of [business APIs] to interface different front ends to SAP and do more to interface SAP to a data warehouse."

By Alan Radding

When it comes to priorities, where enterprise resource planning (ERP) vendors are going and what users want aren't necessarily in sync.

Vendors want to ensure that their current sales growth continues even when year 2000-driven sales peter out. Users, in general, want to get up and running fast, with as much integration and configuration as possible already done for them.

The leading ERP vendors are pursuing a variety of initiatives that they are betting will drive growth in the future. Those include expanding the scope of traditional manufacturing resource planning (MRP) and ERP packages, offering products tailored to vertical markets, pushing down the food chain into the midsize and small business arenas and simplifying the implementation of the complex applications.

In the ERP business, the trendsetters are SAP AG, The Baan Co., PeopleSoft, Inc., J. D. Edwards & Co. and Oracle Corp., according to David Dobrin, director of Benchmarking Partners, Inc. in Cambridge, Mass. "These

vendors have the highest revenue and the most presence," he notes. They also have the broadest franchise. Other ERP vendors, such as Lawson Software, Marcum Solutions, Inc. and QAD, Inc., tend to take a narrower, industry-specific focus.

The key ERP trends all focus on how vendors can increase sales. Jim Shepherd, vice president of research at AMR Research, Inc. in Boston, says he sees that in "the verticalization of the products," or when the vendor tailors the product for a specific industry.

Dobrin says he sees the vendors growing their market by expanding the scope of ERP beyond MRP to new areas, such as supply-chain management.

The expansion of ERP's scope can be seen in the efforts of the leading vendors to partner with or acquire companies that have complementary products. "There is a fallacy that ERP systems do everything. They don't.

SPECIAL REPORT **ERP****TECHNOLOGY**

SIGNALS

ERP vendors are looking for new sources of revenue, and users want tweaks to today's products

The vendors know there is a lot more to do than just resource planning and financials," Dobrin explains.

Although the expansion into supply-chain management has attracted the most attention, vendors also are extending the systems to include sales force automation, customer service, logistics, sales, marketing and more. That strategy runs counter to the best-of-breed strategy, where organizations adopt the best product for each function — MRP, customer service, sales, human resources, plant maintenance — and worry about integration later.

For example, Baan acquired Aurum Software last year to add customer interaction to its ERP package. J. D. Edwards announced plans to integrate a variety of best-of-breed packages with its OneWorld product through partnerships with MatrixOne, Inc., The Premisys Corp., Camstar Systems, Inc. and SynQuest, Inc.

Verticalization has become a necessity today if vendors are to continue to grow, Shepherd says. Through verticalization, the vendor's general ERP product is presented as "a series of products, each customized for a specific industry," he explains.

For example, PeopleSoft acquired TriMark Technologies,

which provides life insurance industry software, and Intrepid Systems, which offers retail management capabilities. Oracle announced initiatives to target the automotive, retail, utilities and health care industries with specialized offerings.

Verticalization can be seen as part of a larger effort by ERP vendors to ease the implementation of their products. By now, everyone has heard horror stories of ERP implementations that took two or three years and cost tens of millions of dollars. That happens, in part, because the ERP packages arrive needing to be configured for the business and the industry from the ground up. By configuring parts of the package in advance for a given industry and cutting out functions not required in that industry, vendors can shorten and ease the implementation process. "The preconfiguration may be based on the size of the company, the specific hardware or the vertical market," Shepherd says.

SAP, smarting from user tales of implementation woe, has made rapid implementation a priority. This year it announced rapid implementation initiatives for the public sector as well as the following industries: oil and gas, media, high technology and electronics, engineering and construc-

tion, and chemical.

Another trend is the push into the small and midsize business markets. "The middle market has always been good for packaged applications," Shepherd says. In the 1980s, midsize companies invested extensively in MRP II systems running on minicomputers. Today, those systems are ready for replacement, making a ripe market for the big ERP vendors, provided they can make their solutions easy enough to implement.

The small-business market, which consists of user companies with sales of \$50 million or less, is an even larger opportunity, Shepherd says. But it's much more difficult for the large ERP players to reach that market because the cost of selling into and servicing small businesses is too great for what they can make on each sale.

In terms of technology trends, the World Wide Web and Windows NT are the key issues, according to Dobrin. However, the Web is problematic at this time. Every vendor is Web-enabling its products because users expect it, but "nobody really knows what to do with it yet," Dobrin says. Windows NT draws interest because of concerns that Unix is costly and hard to manage, especially as vendors try to reach smaller businesses.

Users, however, appear less in-

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The key players

Top five ERP vendors by total projected revenue, 1998

SAP AG	\$4.7 billion
Oracle Financials	\$1.9 billion
PeopleSoft	\$1.4 billion
Baan	\$992 million
J. D. Edwards	\$990 million
Others	\$4.8 billion
TOTAL MARKET	\$14.8 billion

Source: AMR Research, 1998

- From a survey by management consultancy Booz Allen & Hamilton, Inc.: 70% of Fortune 1,000 companies have either begun implementing ERP systems or plan to implement them in the next year.

- From AMR Research: 20,000 companies, each with revenue of up to \$250 million, will license ERP systems in the next four years.

- Morgan Stanley claims that 15% to 20% of ERP revenue comes from companies looking to the technology as a solution to the year 2000 problem. But a recent survey of 50 IT executives by Forrester Research, Inc. found that year 2000 fixes didn't make the list of top incentives for installing ERP.

Soaring with services

- Spending will slow somewhat this year and next year as attention turns toward addressing the year 2000 and euro issues but will pick up next year.

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Facts, figures & functions

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The worldwide market for ERP consulting and implementation services will nearly double by 2002, International Data Corp., a Computerworld sister company, said in a study this year. A year-by-year breakdown of revenue in the ERP arena:

1995	\$9.46B
1996	\$12.57B
1997	\$15.39B
1998	\$18.01B*
1999	\$20.17B*
2000	\$23.2B*
2001	\$28.11B*
2002	\$34.29B*

Source: International Data Corp.
* Projected

- No attempt is made to project the impact of currency fluctuations on spending numbers; so any significant currency fluctuations will affect the forecast.

- The client/server portion of the ERP services market will grow at a much faster rate than the total ERP services market, chalking up a five-year compound annual growth rate of 25.2% from 1995 to 2002, vs. 17.4% overall.

World's leading ERP services providers, 1997

ESTIMATED ERP REVENUE

Andersen Consulting	\$990M
Ernst & Young	\$968M
Price Waterhouse*	\$850M
Deloitte & Touche	\$789M
IBM Global Services	\$750M
KPMG Peat Marwick	\$704M
Coopers & Lybrand*	\$413M
Origin	\$400M
Cap Gemini	\$390M
Computer Sciences Corp.	\$375M

* Merged to form PricewaterhouseCoopers this year
Source: International Data Corp., 1998

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MIXED SIGNALS

CONTINUED FROM PAGE 67

interested in the underlying technology, at least at the moment. Whether the applications use components, objects, Java or whatever tomorrow's latest technology will be doesn't concern users — except to the extent that they must support the system in the long run.

"The technology is less important to users now than in the past. We are not in the midst of

a major paradigm shift that will leave somebody behind," Shepherd says. There's little fear at this point that ERP vendors will get too far ahead of users in the technology arena.

Other trends include the effort to make ERP systems more manageable through integration with systems management technology and improved access to the vast amounts of data those

systems collect.

Users voice only token interest in systems management; few say the management of the ERP applications needs immediate or drastic attention. Improved data access capabilities, however, draw more user interest. □

Radding is a freelance writer in Newton, Mass. His Internet address is radding@mediaone.net.

ERP users, who have their own wish list when it comes to what vendors should be focusing on, generally welcome the directions that leading vendors are taking, with some exceptions. The differences often are of degree or timing, as reflected in the following wish lists of several customers of major ERP vendors:

[SAP user] *Dick Weaver, business area manager, Farmland Industries, Inc. in Kansas City, Mo.* "I've got two things I'd like SAP to do faster: bring out a more robust set of [business application programming interfaces] to interface different front ends to SAP and do more to interface SAP to a data warehouse."

Weaver acknowledges that SAP is moving in both those directions; it is the slowness of SAP's progress that bothers him. He also says he wants SAP to expand into more functional areas. Farmland already is doing extensive integration of agricultural, industry-specific functionality with SAP, but "we don't like to do integration within our own organization."

[Baan user] *Mark Bland, international project manager/information systems, Butler Manufacturing Co. in Kansas City, Mo.* "We want to access and use real-time information and exchange information across any platform using [Component Object Model]

el/Distributed Component Object Model] or [Common Object Request Broker Architecture]. We want the interchange of information regardless of the system or platform. Baan has embarked on this, but it is still some way off."

He also encourages Baan to pick up the pace on componentization and the corresponding selective upgrade capability and provide more Internet capabilities. The company has implemented Baan overseas. Because Butler still hasn't decided to implement Baan in the U.S., anything the vendor does to ease and speed implementation will be welcome. "A large part of our money is spent on implementation," he says.

[J. D. Edwards user] *Lee Wachter, vice president and CIO at Olympus America, Inc. in Melville, N.Y.* "All the vendors have to simplify the implementation. The Web is also a priority with us. We welcome the expanded scope because it reduces the risk of integration and lets us focus

on the business." Olympus, however, is concerned about the ability to support systems based on leading-edge technology. Data access, on the other hand, isn't a critical issue now, "but will be increasingly important to us over time," Wachter says.

[Oracle Financials user]

Stephen Stone, general manager, Knight Ridder Shared Services in Miami. "Oracle is pretty much on target with where we want to go. We want workflow. We're already using [an Oracle Financials-based app] over the intranet with 1,000 users requesting goods and services. What we really want is to capture all information at the source and eliminate handoffs, but that's Nirvana."

The company doesn't have a data warehouse, so data warehouse integration isn't an interest to Knight Ridder, although Stone says he realizes the industry at large is pressing for such integration. Efforts to ease the implementation of Oracle Financials also don't im-

press Stone because his organization already has finished implementation. "We did some customizing. Everybody would like it to be easier, but none of these systems are plug and play."

[PeopleSoft user]

Scott Billman, project manager, Government Management Information Systems project for the state of Indiana. "Functional integration is a big deal for us. In the past, we've spent a lot of time and effort trying to integrate modules from different vendors. Now we want as much functionality from one vendor as possible. Data access is also very important. We've never had a central system that delivered information, reporting and analysis to users. We hope to stop building stand-alone reporting systems." Ease of implementation is critical, but Billman says he isn't sure it's feasible. The state took PeopleSoft's public sector version. "We're going to find out soon if it's any easier."

— Alan Radding

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SPECIAL REPORT ERP

CAREER OPPORTUNITIES

STILL IN THE



*ERP remains a quick ticket
to a six-figure income*

**And it's been good
for the career of
Arlene Milano at
Elf Atochem**

By Rochelle Garner

Pssst! Hey, buddy. Want to land a job that brings in the big bucks, increases your professional value and paves a career path that leads to a rosy horizon? Then grab whatever chance you can to work at a company that's committed itself to a well-thought-out deployment of one of the leading enterprise resource planning (ERP) packages.

That means software from the likes of SAP AG, PeopleSoft, Inc., The Baan Co., Oracle Corp. and J. D. Edwards & Co.

"I suspect that in the next four or five years, people who are skilled in anything but the top enterprise systems will become marginal," says Robert M. Rubin, vice president of information services at Elf Atochem North America in Philadelphia. "That's not to say that traditional computer skills will go away — especially since skills have always lasted longer than people

thought they would. But few technologies affect a company as profoundly as an ERP system does."

Little wonder, then, that ERP expertise commands such high salaries. One year's experience with practically any ERP package brings in \$70,000 to \$80,000 annually. People with three to five years' experience under their belt can command up to \$200,000. Professionals skilled in one of the hot applications — such as the SAP human resources modules or

Still in the money, page 72

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& functions

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ERP news

- **Shell Oil Co.** now offers a new business: SAP implementation. The company is using expertise gained through its own SAP implementation to help companies worldwide implement SAP systems. The company claims \$800 million in revenue since launching the venture in January. (*Financial Times*, Aug. 11, 1998)

- **FoxMeyer Corp.** (Carrollton, Texas), a bankrupt, formerly \$5 billion pharmaceutical company, has sued Andersen Consulting over a 1994 contract to install SAP for order processing, inventory control and other business processes. The \$500 million lawsuit alleges that Andersen's "defective work" led to FoxMeyer's failure. In August, FoxMeyer sued SAP AG for an additional \$500 million, accusing the vendor of fraud, negligence and breach of contract. SAP and Andersen deny the charges and have vowed to fight the suits vigorously. (Compiled from *Computerworld* articles)

- One of the world's largest ERP implementations is being finished at The Boeing Commercial Airplane Group. The Baan IV implementation was begun in February 1996; by December 1997, it was installed in 19 parts fabrication plants. Boeing is expected to complete integration of all engineering and sales teams by January. The size of the job: \$20 million, with 50,000 users expected to be connected by completion. (*Computers Today*, Aug. 19, 1998)

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Organizations and fan clubs



APICS (The Educational Society for Resource Management, formerly The American Production and Inventory Control Society), 500

West Annandale Road,
Falls Church, Va.,
22046-4276
(800) 444-2742
www.apics.org

Fan clubs and user forums on the World Wide Web:

- www.sapfans.com
- www.baafans.com
- www.oraclefans.com
- www.peoplesoftfans.com
- www.erpfans.com

Enterprise Architecture User Group (sponsored by Hurwitz Consulting Group in Newton, Mass.)
www.hurwitz.com/enterprise.html

A little ERP humor

From www.erpsupersite.com
Forums and Chat section:

Q. How many SAP consultants does it take to screw in a light-bulb?

A. None. They declare darkness a best practice.

Alternate meanings for ERP:

- Entirely Rong Product
- Estimating Resources Precisely
- Eternally Revised Programs
- Excuses Require Passwords
- Execute Rationales Promptly (make more bad decisions quickly)

STILL IN THE MONEY

CONTINUED FROM PAGE 71

PeopleSoft financials — can nab similar salaries.

But though sky-high pay may buy some happiness, it won't necessarily buy a career. That requires long-term opportunities for growth in whatever direction information technology professionals choose.

Arlene Milano has found that growth at Elf Atochem, a huge chemicals producer that outsourced its legacy systems in 1994. The company has completed its R/3 rollout in 12 of 13 divisions and is launching a companywide upgrade to Version 4.0. Milano recently became project leader for that upgrade effort. She began working with SAP as a developer and then got involved in programming, configuration, training and documentation.

"I realized this could be good for my career about four months into it," Milano says. "I was working with businesspeople, understanding how the company functions and learning how all of the processes are so highly integrated. And over the years, I learned how to manage and coordinate a project. Now I can apply my skills to anything, whether it's technically or business-oriented."

That career-enhancing power is likely to spread, according to AMR Research, Inc. The Boston-based market research firm predicts the ERP market will grow at a compound annual rate of 37% over the next five years — exceeding \$52 billion by 2002.

That spells opportunity with a capital "O," extending beyond Fortune 500 corporations and the Big Six to include midsize companies and middle-tier consulting firms.

But the catch is that, outside of consulting firms, few companies have thought about job opportunities at project's end. Such shortsightedness has huge implications for both companies and their employees. When companies don't consider ways to leverage their newly skilled and valuable staff, they sever the threads of corporate loyalty.

TAKING CHARGE

Start with the skills. What's hot? For starters, there's a crying need for people who are expert in implementing SAP's human resources module and PeopleSoft's financial application. Next, companies crave the so-called "functional" professionals, who figure out business require-

ments and map them to each ERP package's configuration tables. Organizations also can't get enough people with technical skills — be it Advanced Business Application Programming, Basis development in SAP or PeopleTools for PeopleSoft. Salaries for those positions, both technical and functional, easily exceed \$100,000.

But the big question, from a career standpoint, is whether demand for both technical and functional skills will remain equally high. Those salaries of \$120,000, \$140,000 and even \$150,000 per year for purely technical proficiency

of running a project," Damiano says. "It gives you a chance to get intimate with the businesspeople who will run that environment. That kind of visibility is always good for a career, at all levels. And it's definitely something that supplements a career in project management."

GETTING OUT OF DODGE

In many ways, Milano and Damiano are twice blessed: They work at companies where IT staff is treated with respect and where the ERP projects evolved into long-term business engines. But not every company installing ERP software can make that boast — which is why so many ERP professionals decide to blaze their own career trails.

Most will migrate to a consulting firm. But though all consulting

SALARIES FOR ERP PROFESSIONALS

JOB TITLE	BASE SALARY	TOTAL COMPENSATION*
Senior programmer/analyst	\$53,000	\$54,600
ERP configurator	\$59,500	\$64,300
Project leader	\$68,300	\$72,000
Senior systems analyst	\$59,000	\$59,600

*All compensation figures represent market averages

Source: Premium Skills Compensation Survey, The Hay Group, Philadelphia

might not last, thanks to the effect of offshore programming shops. For that reason, it's best to follow Milano's example: Supplement technical expertise with an understanding of how and why a business operates.

Then there's the question of where to work. IT professionals have three options: work at companies with well-articulated career paths, go independent or work for consulting firms. Consulting firms typically offer larger salaries but vary considerably in their benefits.

"There are body shops [independent contractor firms that provide little more than administrative support] that will pay \$150,000 a year, but no retirement benefits," says Jon Reed, director of the SAP/ERP division at Allen Davis & Associates.

Fred Damiano's opportunity lies outside consulting firms. A technical program manager at Xerox Corp.'s Document Services Group in Rochester, N.Y., Damiano oversees the division's PeopleSoft implementation.

A certified project manager, he had already embarked on one of the hottest career paths open to IT personnel. By working on the PeopleSoft effort, Damiano says he believes he has further widened his career horizons.

"This goes beyond the mechanics

firms aren't created equal, there's one thing they do have in common: Their staffs live out of a suitcase five days per week. Frankly, it gets old.

However, ERP professionals don't have to work for someone else. Just ask Andy Guagenty, who gave up the life of a Big Six consultant earlier this year.

Guagenty has gone independent. The benefits? He earns \$200,000 by working 45 weeks per year, has more free time and the ability to choose the projects that interest him. Equally important, he's taking charge of his own destiny.

"To me, this is the best position someone like me, with an entrepreneurial bent, could be in," says Guagenty from his Franklin, Mass., home. "I've worked with a diverse array of businesses, and that's something I can apply anywhere."

Notice a theme yet? All of these ERP experts followed their own compasses and are on the same road to long-term success. All say they have learned skills and picked up knowledge they can apply wherever their hearts take them. And if that isn't the definition of a great career, what is?

Garner is a freelance writer in San Carlos, Calif.

IT Careers

Career Counselor

IT pros obviously can get a big increase in pay by jumping ship to another company. But is it worth it?

JOB-HOPPING

Out of the frying pan, into the fire

IT'S NO SECRET THAT AN experienced IT pro can get a significant increase in salary by jumping ship to work for a company's competitor or any other organization willing to foot the bill. But is such a move really worth it in the long run? How often can you get away with it before damaging your reputation?

The most common reason for leaving today is a desire to earn more money. Next is lack of technical progression. Also ranking high is an incompatible supervisor.

Whatever the reason, resumes that routinely show fewer than two years at the same job can result in a stigma of flakiness. A rule of thumb to remember: An acceptable amount of job turnover is to have worked an average of at least three years per job throughout your work history.

FLEETING GLORY?

Fortunately for job seekers, we're riding the all-time high wave of technical talent shortages. As a result, hiring managers may be more forgiving of a higher rate of job-hopping. Even so, employers still want to see that candidates have demonstrated a commitment to their work and progressed in their careers. If a person is changing jobs without progression, it may be perceived as moving just to make more money. On the other hand, if you've spent a long time at one company, be sure to show on your resume a progression of responsibility, leadership and larger budgets handled.

PROGRESSION A KEY

Though two years is too short, more than six years in the same position with the same employer — without additional responsibilities or other project involvement in that span — may be too long. Three to five years seems to be the acceptable level of time spent on the job with the same employer without provoking questions as to whether or not you gave it a good try. Many IT positions keep workers intellectually challenged for many years. Systems engineers are faced with new customer issues daily. On the other hand, technical support departments expect their technicians to move into a new position within their organization after about 18 months. In any event, once your job has reached a technical plateau and you're unhappy, it's time to move on.

THE RIGHT THING TO DO

On your resume, list the reasons for leaving each of your previous jobs. Be sure those reasons reflect a conscious choice to move on, not something that forced your departure. You may also want to list the most positive experiences or skills learned. This list will help prepare you to answer interview questions such as "Why did you leave?"

or "What did you like most about working there?"

Even if you left your previous employer on bad terms — never bad-mouth it in an interview. Think of a creative, truthful way of explaining the reason for leaving in a positive, proactive style such as: "After several years of enjoying my work, I decided it would be better for my career to take on new challenges."



BY LINA FAFARD

FOLLOWING THE MONEY?

Most job-hoppers look for a new position every 18 months, acknowledging to recruiters that their motive is more money. They may be looking for \$10,000 more per year than what they are earning now; three months later, it could be up to \$15,000. Yet they're often savvy enough to convince a potential employer that the reasons for leaving a previous job involved an isolated incident — and that this is the unique opportunity they've been seeking.

So if you're not just hopping but expect to see a bit more in the paycheck, what can you expect? Most IT salary increases are running in the 15% to 20% range for a new job, depending on the previous salary. However, hiring managers have salary guidelines and must stick to those parameters. Some companies are making salary adjustments to help keep their IT staff from job-hopping, but many others are putting the brakes on rising salaries and offering noncash incentives.

THE CONTRACTING ALTERNATIVE

If you find yourself moving from one job to the next quickly, you may want to consider contracting. In that arena, changing jobs is part of the plan. Professional contractors schedule their work, and because they are already making a good living, typically don't job-hop. Completing the assignment is critical for callbacks and referrals in their line of business.

Before you leap just for more money, check to see if your supervisor is willing and/or able to increase your salary to be more in line with the going rate. You may even try for an internal transfer to another team with a pay increase. Still, don't trade job satisfaction for a couple more dollars per hour, a possibly longer commute and co-workers you may not like as much as your buddies in the next cube. □

Fafard is the branch manager of Montgomery West, a retained executive search firm in Torrance, Calif. Her Internet address is LinaFafard@aol.com.

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Wilmington, PA to research emerging technologies. Require experience in design development of device drivers for WAN's and ATM's using C/UNIX and NT. Project Engineer to act as lead in software engineering and development projects using ISO 9000 and SEI models. Require experience in commercial software projects and process management using ISO 9000 and SEI. Attractive compensation package. Send resume to: Lori Copp, Network Machines Inc., 236 Wyoming Avenue, Wyoming, PA 18644.

Senior Systems Analyst to perform complex and critical systems analysis tasks on SAP (Systems, Applications and Products in Data Processing) in data processing systems including installation, implementation, troubleshooting, resolving technical problems, working out software modifications to suit client requirements at various client locations; to maintain close liaison with SAP computer scientists and engineers to work out software modifications using related computer hardware and applications software. Need four (4) years or equivalent in relevant higher education in business or computer science; at least four (4) years of experience as systems analyst in the computer field including knowledge and experience in SAP systems including SAP R/3 Basis and related hardware and software applications. The qualified applicant can work from his/her home. The job site is in Stamford, CT. Salary is \$100,000.00 per year. If qualified send resume and cover letter documenting minimum qualifications to: Attn: Job Order # 3221301, Program Support-3rd floor, Connecticut Department of Labor, 200 Folly Brook Boulevard, Wethersfield, CT 06109. Applicants will be required to present proof of legal authority to work in the United States.

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C++ Software Developers
Utilize knowledge of computational theory to analyze, design, & develop software logical functions for warehouse management software system utilizing object-oriented C++ & CORBA on a Unix platform with an Oracle database. Utilize class design & class implementation. MS in computer sci., information technology, or technical discipline (such as math, engineering or physics).

Resume to: J. Lurey, Manhattan Associates, 2300 Windy Ridge Pkwy., 7th Fl. North, Box 100, Atlanta, Georgia 30339.

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Network/Database Engineer needed F/T by Non-Profit Assoc. for College Career Service Professionals & Recruiters in Bethlehem, PA. Must have Masters in Elect. Engg or Comp Sci & 6 mos exp in programming & network support. Send resume to: Dept. C, National Association of Colleges and Employers, 62 Highland Ave., Bethlehem, PA 18017.

Senior Systems Analyst to perform complex and critical systems analysis tasks on SAP (Systems, Applications and Products in Data Processing) in data processing systems including installation, implementation, troubleshooting, resolving technical problems, working out software modifications to suit client requirements at various client locations; to maintain close liaison with SAP computer scientists and engineers to work out software modifications. Need four (4) years or equivalent in relevant higher education in business or applied science; at least two (2) years of experience as analyst/programmer in the computer field including knowledge and experience in SAP systems including SAP R/3 Basis and related hardware and software applications. The qualified applicant can work from his/her home. The job site is in Stamford, CT. Salary is \$175,000.00 per year. If qualified send resume and cover letter documenting minimum qualifications to: Attn: Job Order # 3221245, Program Support-3rd floor, Connecticut Department of Labor, 200 Folly Brook Boulevard, Wethersfield, CT 06109. Applicants will be required to present proof of legal authority to work in the United States.

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Software Engineer needed F/T by Co providing Comp Services. Job Loc: Middletown, NJ. Bach in Comp Sci, Comp Engg or Electrical Engg needed. Respond to: HR Dept., H&L Technique, Inc., 11 Chestnut Drive, Colts Neck, NJ 07722.

SOFTWARE ENGINEER needed F/T for FL Comp Sys Integration Co. Must have 1 yr exp in conducting research dsngn relational database & dvlpng s/ware sys with h/ware product dvlpmt using imaging integration sys in C++. B.S. in Electrical Engg needed. Respond to: Global Data Solutions, Inc., 7800 W. Oakland Park Blvd., Suite C-306, Ft. Lauderdale, FL 33351.

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Software Engineer needed F/T by Comp Services Co. Job Loc: Middletown, NJ. Must have 1 yr exp analyzing, dsngn & dvlpng s/ware for networks using C++ & TCP/IP in UNIX environment with ORACLE d/base. Master's in Comp Sci, Comp Engg or Electrical Engg needed. Respond to: HR Dept., H&L Technique, Inc., 11 Chestnut Drive, Colts Neck, New Jersey 07722.

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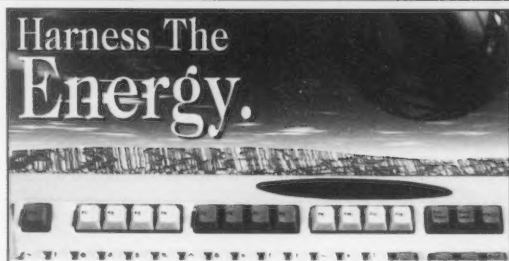
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Software Engineer, Sr. wanted by IT Consulting Co. in Houston, TX. Must have 1 yr exp in: S/ware devlpm on Windows & UNIX platforms; & client/server devlpm in VB for Internet/Intranet applic devlpm in VBScript, Visual Studio & Visual InterDev. BS or equiv in Comp Sci. req. Respond by resume to: HR Dept., Technomation Systems, Inc., 580 Westlake Park Blvd., Ste 710, Houston, TX 77079.

Software Design Engineer: Rockford, Ill. Responsibilities: for: writing, designing & developing test applications equipment (TE) on Microsoft Windows (3.x, 95 & NT), a multi-threaded & multiprocess environment, using object-oriented (OO) design & programming; writing Windows 3.x using Microsoft Foundation Class (MFC)/Object Windows Library (OWL). Windows Application Programming Interface (API) with understanding of object-oriented concepts in C++ for Electronic Control Units & Electronic Fuel Control Units for large & small gas turbine engines; writing programs in C & interfacing with hardware. Specific duties include: drafting detailed design, interfacing with design engineers on assigned projects; presenting design concepts & details; directing technicians; supporting internal & customer end-users; develop Windows Dynamic Link Libraries (DLL) & OLE controls & device drivers involving ISR (interrupt service routines) & DMA (direct memory access) handlers for proprietary hardware; developing installation software for TE setup; documenting designs using OO notation; writing technical manual & Windows on-line help; administering procedure for releasing TE software; & assisting in developing TE in UNIX/Windows & pSOS (real time operating systems) multitask system including pSOS & device drivers for proprietary hardware using C. Bachelor's in Electrical Engineering required with at least 2 mos. of experience as a Programmer/Research Assistant or Graduate Assistant for Master's Degree in Electrical Engineering or any combination thereof. Or work experience for coursework required, must have: 2 mos. writing programs with Windows 3.x using Microsoft Foundation Class (MFC)/Object Windows Library (OWL); 2 mos. writing programs with Windows API with understanding of object-oriented concepts in C++ & interfacing with hardware; & 1 class in Control Theory. No experience is required if applicant has Master's Degree in Electrical Engineering. 40 hrs./wk. M-F 7:30 a.m. - 4:00 p.m.; \$45,000/yr., overtime exempt. Must have proof of legal authority to work permanently in the U.S. Send Resumes to: Illinois Department of Employment Security, 401 South State Street - 7, North, Chicago, Illinois, 60606, Attention: Bert Grunne. Reference # IL 19863-P. No Calls. An Employer Paid Ad - Send 2 Copies of Both Resume & Cover Letter.

Programmer/Analyst (multiple positions) (Various location in the Chicago area). Client/Server application programming and program development using VISUAL BASIC and POWERBUILDER. \$58,000/yr, 40 hrs/wk, Mon - Fri 9am to 5pm. REQ'D: 2 yrs exp. in job offered. Must have proof of legal authority to work permanently in the U.S. Send 2 copies of both resumes & cover letters (NO CALLS) to Illinois Department of Employment Security, 401 South State St, 7 North, Chicago, IL 60605. Attn: Arlene Throver, Ref. # VIL 19725-T.

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Systems Analyst/Programmer needed for software development and consulting firm located in Cedar Rapids, Iowa. Job duties include: Analyze, design, develop, test and implement computer software applications and convert existing systems to new platforms. Use COBOL, MVS/XA, JCL, CICS, DB2, VSAM, and ASSEMBLER. Applicant must have B.S. degree in computer science, engineering, math or business. Applicant must also have 2 yrs. exp. in the job duties listed above. 40hrs/wk., Mon-Fri, 8:00 am - 5:00 pm, \$53,000/yr. Must have proof of legal authority to work in the U.S. Send resume to the Iowa Workforce Center, 600 Seventh St., SE Cedar Rapids, IA 52406-0729. Please refer to Job Order #1100767. An Employer paid advertisement.

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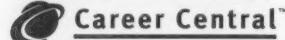
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The Computerworld Washington, DC Area Corporate Technical Recruiting Conference!

Monday, September 28, 1998
Fairview Park Marriott, Falls Church, Virginia

On September 28, 1998, you have a special opportunity to update your recruiting skills and network with recruiters in your area at the third annual Washington, DC Area Corporate Technical Recruiting Conference, held at the Fairview Park Marriott, Falls Church, Virginia.

A Full Schedule of Contemporary Topics

- 7:45am Continental Breakfast & Conference Registration**
- 8:30am Concurrent Sessions:**
Building an Internet Recruitment Strategy
 Tracey Claybrooke, Claybrooke & Associates
Retaining the Best: Practical Retention Strategies that Work
 Barbara Mitchell, The Mitchell Group
High Tech/High Touch: Creating the Recruiting Office of the Future
 Sue Keever, The Keever Group
- 10:00am Sponsor Showcase/Coffee Break**
- 10:30am General Session:**
Strategic Staffing in a Competitive Environment
 Carlos Echalar, Litton PRC
- 12:00pm Luncheon Keynote:**
 Paul Gillin, Editor, Computerworld
- 1:30pm Town Hall Forum**
 Moderator Gary Cluff, Cluff & Associates
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 Sue Keever, The Keever Group
- 5:00pm Program ends**

Selected Sessions Include:



Luncheon/Keynote Address Paul Gillin, Editor, Computerworld

Paul Gillin, one of the industry's leading watchers of the Information Systems profession, will give you an up-to-the-minute view in this very special keynote address.



Building an Internet Recruitment Strategy

Tracey Claybrooke,
President, Claybrooke & Associates, Inc.

As mass advertising reaches a consumer by television, radio, billboards, print media in various locations and venues - this same marketing/prospecting effort can take place on the internet to maximize your recruitment efforts. Learn about this and more in this session.



Strategic Staffing in a Competitive Environment

Carlos Echalar,
Vice President of Staffing, Litton PRC

The program will address today's staffing issues from a proactive vs. reactive business approach. The program will also demonstrate a systematic 5 step approach to a full life-cycle staffing process and implementation across the business. Each step contains components and issues that need to be considered in developing and initializing a strategic plan of identifying and attracting today's top talent in an effective and cost efficient manner.



Town Hall Forum Gary Cluff, President, Cluff & Associates

In this session, you'll not only be able to propose your specific questions for open discussion, you'll learn of real world issues and solutions from your peers. You won't want to miss this rare opportunity as Gary Cluff, an expert in the HR field, leads us through this modern discussion of your recruiting topics.

* Registration fee includes continental breakfast, lunch and the complete Conference Resource Guide.

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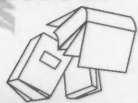
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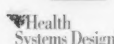
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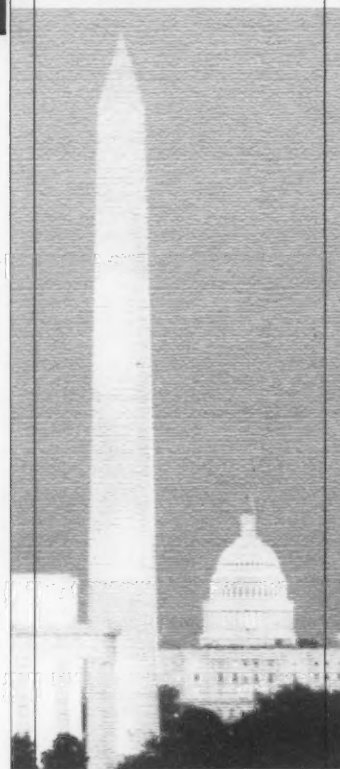
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INDUSTRY ALMANAC

3Com awaits modem surge

After meeting earnings expectations in June, in recent weeks 3Com Corp. has seen its stock price drop to less than half of the 52-week high of \$56.75 it reached last year. For the quarter ended May 31, Santa Clara, Calif.-based 3Com posted \$63.6 million in profits on revenue of \$1.375 billion — barely above the same quarter a year earlier, when revenue was \$1.371 billion.

Revenue was up only slightly, but analysts say they are hopeful that the 56K bit/sec. modem market will grow in the fall and that sales of 3Com's modems and other networking products will signal a surge for the stock. "I've got it rated as a Buy, sort of a bargain-hunter special," notes Michael Geran, a financial analyst at Pershing, a division of DLJ in Jersey City, N.J. Geran says that if the stock doesn't pick up this quarter, he expects rising demand for modems will boost it next year.

Scott Heritage, an analyst at Warburg, Dillon & Read in New York, also predicts an upsurge in the fall — especially as Internet service providers begin marketing higher-speed access to consumers. Heritage dropped the stock from a Buy recommendation to a Hold last March.

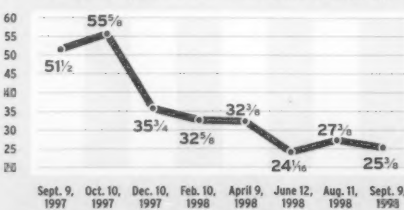
The company has been struggling since that time, partly because of last year's industry fight over the 56K bit/sec. modem standard. Investors also were skeptical about 3Com's acquisition of U.S. Robotics, which included the PalmPilot handheld computer line and many remote-access products.

Heritage says that 3Com has "been right on track with earnings estimates, but the company hasn't shown revenue growth in the last three quarters."

Heritage divides 3Com's products into two divisions: networking products such as hubs, switches and routers; and client access products such as Internet modems and network interface products. Modems account for perhaps one-third of 3Com's sales, and the popular PalmPilot accounts for only about 5% of overall sales, analysts say. — Matt Hamblen

3COM SLIDES

3Com's stock price is less than half its level of a year ago



Each 52-Week Range Sept. 11 '97 to Sept. 11 '98 2 PM EST. CHG. CHG. PCT.

Communications and Network Services UP 4.6%

ASND	56.75	22.94	3COM Corp.	28.19	3.94	16.2
ATD	52.15	30.13	AMERSTECH Corp.	43.88	0.81	1.7
ASMS	55.06	22.00	ALCANTARA COMMUNICATIONS	44.75	5.94	15.3
T	68.10	40.63	AT&T	55.18	1.63	3.0
BT	13.38	47.75	BELL SYSTEMS INC.	2.75	0.25	10.0
BEL	53.00	37.38	BELL ATLANTIC Corp.	41.25	1.00	2.4
BLS	73.63	41.31	BELLSTATE Corp.	67.63	1.44	2.2
BKRT	22.75	9.50	BROADBAND TECHNOLOGY	11.75	0.80	7.0
CS	16.25	6.63	CABLEVISION SYSTEMS	8.13	1.06	13.0
CCRM	21.88	8.13	CENTRICUM COMMUNICATIONS	9.50	1.19	14.3
CSCO	105.25	45.50	CISCO SYSTEMS Inc.	90.06	0.69	0.8
CMNT	6.50	3.38	COMCAST NETWORK TECH.	4.75	0.06	1.3
CHCK	41.00	7.88	CONCENTRIC NETWORK CORP.	16.13	1.11	7.5
DCI	35.49	16.50	DOC COMMUNICATIONS	26.83	0.31	1.2
FORI	28.00	13.25	FORE SYSTEMS Inc.	20.88	4.38	20.5
CTI	7.38	2.50	GENERAL DATA COMM. INTEL.	3.06	0.44	16.7
CSX	47.25	13.56	GENERAL SIGNAL NETWORKS	36.11	0.38	1.0
GTE	64.38	40.50	GTE Corp.	48.11	0.19	0.4
LI	108.50	36.00	LUENT TECH.	76.00	1.60	2.1
MAGC	8.75	2.65	MAGC NETWORKS INC.	2.88	0.25	8.0
MCI	70.63	27.31	MCI COMMUNICATIONS CORP.	57.25	0.75	1.3
NETM	5.25	1.00	NETNADANCE Inc.	1.06	0.00	0.0
NTR	3.50	0.63	NETRIX Corp.	1.18	0.11	9.4
NDI	13.75	5.50	NETWORK COMPUTING DEVICES	6.25	0.50	7.4
NK	20.63	9.75	NORTEL EQUIPMENT TECH.	11.13	0.75	7.2
NIN	69.38	38.00	NORWEGIAN NETWORKS CORP.	20.63	1.00	4.1
NT	69.25	39.69	NORTHERN TELECOM LTD.	46.44	4.13	8.2
NOV	11.63	6.81	NOVELL Inc.	11.50	1.41	13.9
NOV	14.50	1.25	OPTICAL DATA SYSTEMS Inc. (L)	1.63	0.13	8.1
PCTI	13.50	5.38	PICTURETECH Inc.	6.00	0.25	4.3
OPEN	1.50	0.56	PROTON Inc. (L)	0.88	0.13	12.5
RACO	4.11	1.00	REACTOR Inc.	1.11	0.13	13.1
RADS	29.38	5.00	RADANT SYSTEMS Inc. (L)	5.11	0.00	0.0
RTI	10.13	1.88	RETEL Inc.	2.31	0.19	8.8
SBC	46.50	28.00	SBC COMMUNICATIONS	36.47	1.00	2.8
SFA	27.94	14.00	SCIENTIFIC ATLANTA Inc.	19.06	0.19	1.0
SUN	15.19	3.50	SUNWORLD Corp.	10.94	0.31	2.8
SWT	75.63	45.25	SWINERT Corp.	67.94	3.56	5.0
QWST	47.50	20.88	QUEST COMM. INT'L INC.	26.00	0.25	1.3
MCI	18.13	6.25	MANDALAY COMMUNICATIONS CORP.	7.06	0.11	1.3
USW	53.00	0.19	U.S. WEST Inc.	50.50	1.38	2.8
XIRC	27.25	8.63	XIRCOM	22.13	4.38	24.6
XTN	31.31	13.38	XTEN Corp.	16.19	1.31	8.8

Note: Bay Networks stopped trading Aug. 28.

PCs and Workstations UP 4.9%

AAPL	43.75	12.25	APPLE COMPUTER INC.	37.88	2.75	7.8
HPQ	19.75	21.12	HEWLETT PACKARD CO.	11.50	2.12	18.2
DELL	64.00	17.50	DELL COMPUTER CORP.	56.44	2.63	4.9
GTW	68.75	25.00	GATEWAY 2000 Inc.	49.06	2.50	5.4
INTL	62.38	47.75	INTELLECT SOFTWARE INC.	42.12	0.88	2.1
MOT	20.75	8.44	MOTOROLA INTERNATIONAL INC.	14.75	0.88	6.3
NORR	63.88	34.00	NORR INC.	34.44	0.06	0.3
PERC	16.50	9.50	PERICOM SOFTWARE	14.44	0.06	0.4
SUNW	52.81	30.38	SUN MICROSYSTEMS INC.	47.69	5.03	13.4

Large Systems UP 3.4%

DCN	14.31	7.00	DATA GENERAL CORP.	9.38	0.88	10.1
BEM	138.13	88.63	BENTLEY SYSTEMS INC. (L)	118.13	4.00	3.3
MCD	6.63	3.38	MERIDIAN DATA INC. (L)	1.69	0.19	10.0
NCR	18.50	24.81	NCR Corp. (L)	24.81	0.56	2.2
INCR	46.53	3.56	INTEGRATED TECHNOLOGY INC.	4.75	0.59	12.3
SNT	29.13	5.75	SUNTECH SYSTEMS INC.	6.94	0.19	2.8
TXM	6.00	2.50	TEXAS MICRO INC.	2.63	0.38	12.5
SEA	16.50	21.44	SEAGRAM COMPUTER INC.	13.56	0.06	0.4
UIS	10.69	11.06	UNISYS Corp.	22.56	5.56	28.8

Software UP 2.4%

ADOB	53.13	23.63	ADOBE SYSTEMS INC. (L)	27.69	3.31	11.6
ASDIA	15.63	2.56	ASTRO SOFTWARE INC. (L)	2.75	0.13	4.8
APLA	10.38	2.06	APPLIX Inc. (L)	2.44	0.16	6.8
ADIT	15.88	6.63	ADDITIONAL SOFTWARE	11.25	0.13	1.1
ASC	36.38	19.25	ASCENT SOFTWARE	22.56	0.84	3.7
ADSI	51.13	22.25	AUTODESK Inc.	25.19	2.25	9.8
BMCS	35.50	27.38	BMC SOFTWARE INC.	31.75	5.06	10.8
ADSI	26.00	17.25	ADDITIONAL SOFTWARE INC.	17.25	0.03	0.2
BOBY	20.00	8.75	BUSINESS OBJECTS	13.00	0.00	0.0
CATN	3.50	0.13	CATALYTIC SOFTWARE INC.	0.25	0.03	14.3
CS	3.31	0.88	CONCEPT SOFTWARE	0.88	0.00	0.0
CHSP	10.50	16.88	CHECKPOINT SOFTWARE TECH. (L)	18.19	1.44	7.3
COGN	14.75	16.63	COGNOS Inc.	19.00	0.44	2.4
CA	61.94	26.00	COMPUTER ASSOCIATES	29.75	0.06	0.2
CPRI	60.31	26.35	COMPUWARE CORP.	55.38	4.13	8.0
CSRE	9.81	2.50	COMSWARE INC.	3.63	0.25	6.5
CSST	5.38	1.06	CORUS Corp.	1.38	0.16	12.8
DCTM	53.13	20.00	DATAWARE TECH. INC. (L)	21.94	0.44	16.7
DCI	19.63	26.00	DOCUMENTUM Inc.	41.00	1.25	3.1
FRE	32.88	7.50	FRONTIER Corp.	16.78	0.86	4.1
FRT	16.00	2.78	FORTE SOFTWARE	3.44	0.44	14.6
CPRI	40.00	20.38	CREATIVITY SOFTWARE INC.	17.25	2.25	6.4
HUMCF	34.25	18.00	HUMANWARE CORP. LTD. (L)	18.50	0.00	0.0
HYSL	53.25	25.13	HYPERION SOLUTIONS CORP.	26.69	1.06	4.1
IBC	20.00	3.75	INFORMATION RESOURCES	10.89	0.44	3.9
INF	10.75	3.00	INFORMA Corp.	4.00	0.03	0.8
INPR	12.19	5.00	INPRO Corp. (L)	5.44	0.19	3.6
INCR	14.19	5.00	INTERCOMP CORP.	5.81	0.13	2.2
LEAF	4.00	0.75	LEAF SOFTWARE INC.	1.76	0.09	5.5
INTL	21.25	10.63	INTERTECH Inc.	12.00	0.19	1.5
INTU	67.94	24.38	INTUIT Inc.	41.44	2.38	6.1
JDEC	46.25	24.88	J.D. EDWARDS INC.	41.81	0.21	0.7
TLC	32.81	13.00	TELECOM CO. (TH)	20.31	3.18	19.9
MANU	66.38	10.06	MANUFACTURING GROUP, INC.	10.06	1.56	15.1
MATP	14.25	8.18	MATHEMATICS CORP.	10.94	0.31	2.9
MATH	6.63	1.75	MATHSOFT	2.19	0.03	1.4
MENI	13.00	6.75	METRO GRAPHICS	7.69	0.16	2.1
MFCY	60.63	23.25	MICRO FORUM Inc.	23.88	1.38	5.4
MCIX	14.88	6.00	MICROPIX INC.	9.25	0.88	9.6
MSFT	119.63	59.00	MICROSOFT CORP.	103.11	5.50	5.6
ORIS	5.25	0.44	OBJECTWARE Inc.	1.19	0.06	5.6
OMTL	15.00	2.19	OUTLOOK LTD.	2.75	0.25	8.3
ORIS	19.63	17.75	ORACLE CORP.	25.25	5.00	24.7
PMTC	36.31	9.00	PARAMETRIC TECHNOLOGY	10.75	0.81	8.2
PSFT	57.44	26.88	PERSPECTIVE	32.75	0.11	0.3
PFTC	18.38	6.75	PIONEER TECHNOLOGIES	7.38	0.11	1.2
PLAT	27.25	7.63	PLATINUM SOFTWARE	13.50	0.31	2.4
PLAT	34.31	17.00	PLATINUM TECHNOLOGY	20.00	1.56	8.3
PROG	28.13	12.44	PROGRESS SOFTWARE CORP.	19.50	2.25	10.3
PRND	20.13	19.44	PRINCE SYSTEMS INC.	13.00	1.11	8.5
REIB	10.13	1.88	RED BEAR SYSTEMS INC.	2.31	0.19	8.8
ROSS	5.40	2.00	ROSS SYSTEMS INC.	2.50	0.19	7.9
SAP	60.13	40.25	SAP AG	48.75	0.81	1.7
SCC	7.25	2.38	SCO INC.	2.63	0.11	4.5
SYTH	42.75	9.38	SYNTHETIC DYNAMICS TECH.	11.18	1.44	11.8
STR	32.81	16.25	STERLING SOFTWARE INC.	22.00	1.00	4.8
SORC	10.00	8.75	STRATUS SYSTEMS RESEARCH	9.19	0.06	0.7

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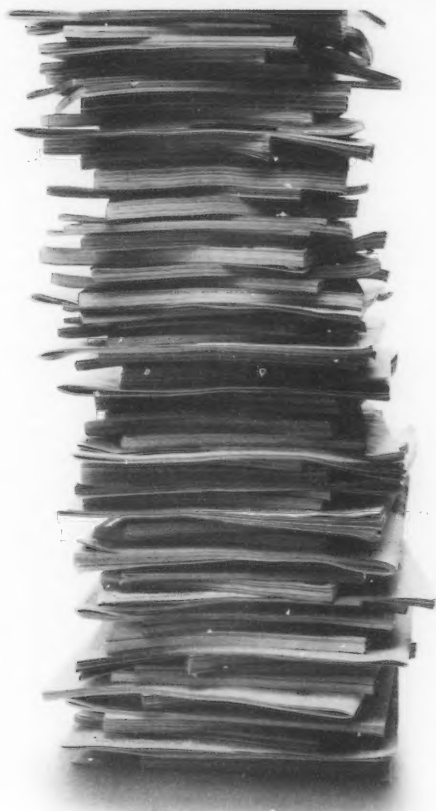
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MICROSOFT VS. THE DOJ

Users weren't bullied

CONTINUED FROM PAGE 1

thy Regan, manager of advanced information development at Federal Express Corp. in Memphis. "Maybe their software causes you to go in a certain direction, [but] there's been no coercion or strong-arming that I'm aware of."

Asked if he has felt pressured by Microsoft, Barry Lynn, executive vice president and CIO at Wells Fargo Bank in San Francisco, said, "Absolutely not. We have an excellent working relationship with Microsoft. Their [products] interoperate in our network with many of their competitors' tools."

Microsoft officials have consistently denied using coercive pressure on the company's customers. But two consultants claimed that Microsoft does pressure users into not buying software from rival software makers, as the government claims.

And one user claimed that Microsoft's strong-arm tactics start at the most basic level: its Microsoft Certified Systems Engineer training classes.

"Asking questions or pointing out flaws and shortcomings in Microsoft products during training classes is a major-league offense," said one senior information systems manager who works for a New York-based Big Six accounting firm and who

said he committed such a faux pas.

Several of the users polled said they knew that Microsoft had pressured OEMs. "Microsoft uses the tactic of FUD — fear, uncertainty and doubt — as a way of closing out their competitors," said Patrick Schmid, a software engineer at Bently Nevada Corp. in Minden, Nev.

Many suggested that the government should concentrate its efforts on Microsoft's relationships with OEMs.

"The closest thing to [strong-arm tactics] I've heard about is that sometimes a company may want to run a third-party product, and Microsoft says that if they do, it won't support the platform," said Jack Cohen, a systems specialist at Coastal Corp. in Houston. "Is it possible Microsoft does this? Sure."

"The point [the government] needs to concentrate on is Microsoft's tactics that are used with the largest hardware vendors and the bundling deals. It will be hard enough to prove that case," Cohen said.

WAS DEC PRESSURED?

On that front, also last week, came charges that former Digital Equipment Corp. CEO Robert Palmer was pressured by Microsoft CEO Bill Gates into

WITNESS LIST

Department of Justice's witnesses:

- James Barksdale, Netscape Communications Corp.
- David Colburn, America Online, Inc.
- William Harris, Intuit, Inc.
- Steven McGeady, Intel Corp.
- John Soyring, IBM
- David Farber, University of Pennsylvania
- Edward Felten, Princeton University
- Franklin Fisher, MIT
- David Sibley, University of Texas
- Scott Vesey, The Boeing Co.
- Glenn Weadock, Independent Software, Inc.

Microsoft's witnesses:

- Richard Schmalensee, MIT
- Michael Dertouzos, MIT
- John Rose, Compaq Computer Corp.
- Michael Devlin, Rational Software Corp.
- Paul Maritz, Microsoft
- James Allchin, Microsoft
- Joachim Kempin, Microsoft
- Brad Chase, Microsoft
- Yusuf Mehdi, Microsoft
- Cameron Myhrvold, Microsoft
- William Poole, Microsoft
- Daniel Rosen, Microsoft

dropping development of a network computer code-named Shark that had gone out to at least one customer site.

Digital refused comment, and Microsoft would say only that it had a "great relationship" with Digital. But according to Oracle Corp. CEO Larry Ellison, after Palmer suddenly canceled the large project that it had been developing with Oracle, other Digital employees told him Palmer had been forced to withdraw from the partnership under pressure from Gates.

"There were rumors at the time that Gates had told Palmer

to either back off Larry" or face the prospect of Microsoft withdrawing support for Digital's Alpha chip, said longtime Digital follower Terry Shannon, editor of "Shannon Knows Distributed Enterprise Computing," a newsletter in Ashland, Mass.

Digital apparently was very close to releasing a network computer built using a StrongARM RISC chip and based on a specification from Network Computers, Inc., an Oracle subsidiary. Several prototypes of the product in fact were demonstrated at Oracle World, and the company had also scheduled a

session on network computers at a DECUS user group session in Copenhagen, which was canceled at the eleventh hour, Shannon said.

"The government is probably going out on a limb with this [pressuring] charge," Cohen said. "Even if it were true, what's really wrong with that? As a company, you don't have to take the deal with Microsoft."

With a Sept. 23 trial date looming ever closer, both sides in the government's antitrust case against Microsoft last week rolled out their witness lists.

While Gates was conspicuous in his absence from the Microsoft list, Scott Vesey, an executive at The Boeing Co., stood out as the lone user representative among the vendors and academics on the Department of Justice's list (see chart).

Vesey likely will be asked to describe the typical relationship a large corporate customer such as Boeing has with Microsoft, including whether Microsoft exerts pressure on its customers to stay loyal to the Microsoft brand and not purchase software developed by its competitors. □

MORE ONLINE

For documents, news and articles related to the Microsoft antitrust case and an archive of Computerworld articles on the topic, visit Computerworld online.

www.computerworld.com/more

Microsoft subpoenas turn tables

► Rivals' documents sought; judge mulls delay

By Stewart Deck, Patrick Thibodeau and Jaikumar Vijayan

IN A TIT-FOR-TAT move, Microsoft Corp. issued an eleventh-hour flurry of subpoenas last week seeking to prove that rival companies conspired to lock it out of various marketplaces. According to some cynics, the move could be designed to delay the start of the trial.

"It is important for us to look for information about [those] companies colluding together to stifle competition [because] these are the exact issues the government has raised regarding Microsoft," said Jim Cullinan, a Microsoft spokesman.

At the same time, Microsoft accused the Department of Jus-

tice of attempting to expand its case beyond its original boundaries and asked the court to dismiss the case on the grounds that the government's suit was "fatally flawed."

At a contentious hearing last Friday, Judge Thomas Penfield Jackson did not rule on Microsoft's request for dismissal. The trial is slated to start Sept. 23.

At Friday's hearing, Judge Jackson asked more questions of Microsoft than of the DOJ lawyers. He was most interested in learning why Microsoft's browser had to be a separate product from the operating system and what consumer benefits were gained by that.

Calling the antitrust case

"half-baked" and "of highly dubious merit," attorney John L. Warden, of Sullivan & Cromwell in New York, disputed in court what Microsoft has long argued in legal briefs: that the Windows operating system and its browser are inseparable. "This isn't providing two things in one package, this is providing one thing," Warden said.

But DOJ attorney David Boies said Microsoft has been involved in a predatory campaign against browser rival Netscape Communication Corp. "By giving everything away for free that Netscape is charging for . . . they're not going to have a business anymore."

America Online, Inc.'s agreement to use Microsoft's browser technology also drew the government's ire. While Warden

argued that AOL selected Microsoft in fair competition with Netscape, Boies said Microsoft used its operating system strength to leverage the agreement. AOL might not have picked Microsoft "except for the opportunity to get favorable placement in the operating systems," Boies said.

The Justice Department's witness list indicates that the government is reaching beyond its original case, said Microsoft spokesman Mark Murray, because the list contains only one person, IBM's John Soyring, associated with a PC maker.

But one antitrust expert said that is a reasonable tactic. "The essence of the case against Microsoft is that it has used its power to engage in various predatory practices," said Lewis Noonberg, chair of the antitrust and trade regulation practice group at Piper & Marbury LLP, a law firm in Washington.

"Most courts would recognize that a pattern of abusive predatory conduct would be relevant to the broader question as to whether they were engaging in such conduct."

Wide-ranging subpoenas were issued to Sun Microsystems, Inc., Netscape Communications Corp., IBM, Oracle Corp., Hewlett-Packard Co. and Novell, Inc. Each company confirmed that it had received civil subpoenas from Microsoft, but most declined to elaborate further.

Sun spokeswoman Lisa Poulsen said Sun received a civil subpoena Sept. 4 requesting documents regarding meetings or communications with Apple Computer, Inc., IBM, Oracle and Netscape on topics including Unix, HotJava, JavaScript and World Wide Web browsing software. □

Computerworld staff assisted in this story.

Battle over Java in hands of judge

► Legal limbo could slow adoption, evolution

By Robert L. Scheier

CORPORATE DEVELOPERS are still wondering who controls Java after last week's three-day court battle between Sun Microsystems, Inc. and Microsoft Corp.

U.S. District Judge Ronald Whyte in San Jose, Calif., ended the hearings Thursday without ruling or saying when he would rule on Sun's request that Microsoft stop shipping Windows 98 and its Java development tools until it brings its implementation of Java closer to Sun's specifications.

The legal wrangling makes it harder for large, multinational companies to adopt Java because they typically want "open, standard technologies," said analyst Ron Rappaport at Zona Research, Inc. in Redwood Shores, Calif. Major customers want assurances that Sun controls Java's fate, and "this court case, as long as it endures, is a question mark," he said. "Developers and IT administrators need to make technology decisions today."

"Their business does not stop because a court case has not

ended," Rappaport continued.

"Until it shakes out, we can't plan on anything," said Cyrus Khoshnevisan, an engineering manager at Virtual Vineyards. The Palo Alto, Calif., online wine retailer used Java to write the client portion of a two-tiered client/server application, and "we're not going to rewrite this application at this point," Khoshnevisan said.

Typical of the confusion, Rappaport said, is recent Zona research that shows that developers view Sun as the most influential Java vendor but are more likely to buy Java development tools from Microsoft.

"There's a large part of the market whose heart is with Sun but whose checkbook is with Microsoft," he said.

Citing a judge's order, both sides declined to discuss in detail the final day of the hearing. "I think the argument went extremely well for Sun," said Sun's lead counsel Rusty Day, of law firm Casebeer, Madrid, Winters and Batchelder in Cupertino, Calif. Day predicted the judge would rule on the case within two months but declined to be more specific.

"Microsoft is pleased with their three days in court and believe they have presented pow-

erful arguments to the judge about how Microsoft has fully complied with the contract they signed," a Microsoft spokeswoman said.

Sun, which developed Java, claims Microsoft violated its Java licensing agreement by shipping what Day calls a "non-conforming, polluted" version of Java. Because Microsoft's Java implementation would run best on Windows, it could dilute Java's claims to cross-platform compatibility and thus make Java less likely to challenge Microsoft's Windows as a key PC standard, Sun claims. □

Want to cut TCO?

CONTINUED FROM PAGE 1

any other element of the IT portfolio is unrealistic.

"In the real world, TCO must be placed in context with a variety of other important issues such as supplier market position, access to professional services, application availability, strategic partnerships, service-level agreements and a host of other intangibles that are simply not quantifiable," Aberdeen said.

"There is no easy way to do this," said Priscilla Tate, executive director of the Technology Managers Forum in New York. "If you want to control costs, you have to sit down, face the facts and do a budget."

"I don't think many companies do the in-depth analysis required to understand what their [total cost of ownership] is, and beyond that, the tools aren't very mature in general," said Cassandra Matthews, vice president and chief information officer at PECO Energy Corp. in Philadelphia.

Also at issue, some users said, is that total cost of ownership takes a backseat to other needs or focal points within

their business environments.

For example, "We have little interest in the minimization of total cost of ownership, because we're not really interested in costs so much as gain. Everything we do is driven toward making money," said Chris Horrocks, CIO at Commercial

Financial Services, Inc., based in Tulsa, Okla., which has more than 4,000 desktops.

Nancy Parker, vice president at Federal Home Loan Bank in Dallas, said her company doesn't focus on projects from a cost-of-ownership perspective and doesn't even expect to be able to quantify returns from it. More typically, she said, the focus

is on what needs to get done to fulfill a business need.

But the company is making some headway. Parker said her organization has set desktop hardware and software configuration standards and discourages users from deviating from the norm.

Though vendors rushed to the plate this year to supply operating system-based tools, such as Microsoft's Zero Administration for Windows and simpler

hardware such as thin clients and the NetPC, the lion's share of the cost of supporting IT—which goes toward support, administration and maintenance—was largely ignored.

Analysts said simply using the products that supposedly help IT managers control costs through easier manageability of hardware and software isn't enough. Users have to be able to look at how they deliver services and how support costs are being driven.

"A lot of the vendors are focused strictly on products, but you can't reduce TCO without lowering labor costs or if you don't understand how their tools can change the way service is delivered," said Vaughn Frick, an analyst at Gartner Group, Inc. in Stamford, Conn.

DAUNTING TASK

The prospect of such a massive undertaking is obviously daunting. Gartner Group estimates that 50% of companies have done nothing, despite the fact that even elementary measures such as hardware and software standardization and remote management of desktops and servers can cut overall desktop costs by 25%. Of the 50% that have done something, only about half have been successful.

"The organizations that have made TCO a priority have made significant progress, but there are a lot of folks out there who haven't, and they really don't understand yet where all of the money goes," Frick said.

Vendors such as IBM and

Fort Lauderdale, Fla.-based Citrix Systems, Inc. jumped on the network computer bandwagon, pitching the idea that server-centric clients that could be managed centrally would save lots of money and time. In addition to being wary of the associated back-end administrative costs, many users understandably balked at the idea of trashing their existing environments, which amounted to huge investments.

"I'm not going to run out and replace all my PCs with thin clients," said Matt Merrick, vice president of information systems at Merrick Printing Co. in Louisville, Ky. That in itself would represent a huge cost and massive restructuring, Merrick said.

According to Aberdeen, "Enterprises should not reply on oversimplified... TCO figures as a key buying influence. As long as the customers understand the deceptive nature of TCO and focus instead on balancing it with a careful... consideration of risk-management intangibles, many of the pitfalls associated with a complex application server acquisition can be avoided." □

MORE ONLINE

For articles and white papers on total cost of ownership (TCO) and asset management, along with a TCO calculator, visit Computerworld.com/more.

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Xerox plans copiers that take Notes

By Roberta Fusaro

XEROX CORP. and IBM's Lotus Development Corp. subsidiary last week announced the marriage of their office machines and groupware, respectively, to provide serious workflow functions behind the big green button on Xerox copiers.

The integration will let customers route and share hard-copy and digital documents by using Lotus software to connect Xerox's Document Centre family of digital copiers to the Lotus Domino Web server.

The copiers already let users print, fax and copy documents from their desktops. With the forthcoming software, users will be able to scan documents from Document Centre into the Lotus Notes E-mail format or into a Domino repository. Users across the network will be able to access those documents, Xerox officials said, thus enhancing workflow collaboration.

The Lotus software will be available in the fourth quarter. The product's name and pricing haven't been announced yet.

Charles Jeffers, information technology manager at the Atlanta Convention & Visitors Bureau, uses Xerox's Document Centre 265ST printer for creating proposals. He welcomed the ability to handle tasks from one point, "but we're a Microsoft Office user, and we have no intention of moving to Notes," he said. □



Merrick Printing's Matt Merrick

"I'm not going to run out and replace all my PCs with thin clients"

alt.cw

Dispatches & images from the fringes of the electronic frontier

The Back Page



WILD WEST GOES HIGH-TECH

The U.S. Bureau of Land Management is holding a "Wild Horse and Burro Adoption" live on the Internet. It works like this: See the available horses, weanlings, foals and even a few burros at the Web site (www.adoptahorse.blm.gov), send in an application saying you'll provide a good home, and make a bid online. The program was designed to help prevent overgrazing on fragile Western rangelands.

Patent watch

Recently issued U.S. patents
(number, inventor/assignee, date)

Computer mouse handwriting transfer device. A writing instrument is connected to sliding plates under a computer mouse and transfers the handwriting movements to the mouse for electronic signatures. (5,798,755, Lawrence D. Holgate, Aug. 25)

Set-top terminal that suggests what TV programs to watch. The terminal displays a custom menu of programs that the subscriber is most likely to watch, based on mood, personal profile and history of previously watched programs. (5,798,785, Discovery Communications, Inc., Bethesda, Md., Aug. 25)

Drug-dispensing system for medical centers. A computerized storage cabinet, loaded with prepackaged pharmaceuticals, dispenses a bar-coded package when it gets an order from an office computer. (5,797,515, ADDS, Inc., North Billerica, Mass., Aug. 25)

Source: MicroPatent (www.micropat.com)

3 reasons sales force automation projects fail:

- ▶ You can't get end users to accept the system as it was designed. They stop using it after three months and revert to old methods.
- ▶ You lose the support of upper management, especially when problems crop up.
- ▶ You get caught up in politics with middle management.

Source: Institute of Management and Administration
(www.ima.com), New York

THE FIFTH WAVE by Rich Tennant

Shamelessly, IBM uses Deep Blue to plot, calculate and then beat Gary Kasparov out of parking spaces at local malls.



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Inside Lines

Stayin' alive in the face of SAP

During its two-year SAP R/3 project, Dow Corning made a priority of something besides getting the new system up: keeping its IT workers from crashing. The Midland, Mich., company called in nutrition expert Joel Robertson (author of *Natural Prozac: Learning to Release Your Body's Own AntiDepressants*), who distributed a questionnaire to employees aimed at determining "neurobehavioral styles," said Chief Information Officer Charles Lacefield. The results were used to set up project teams and to identify workers suited to run different phases of the rollout. But only U.S. employees took part. Executives weren't sure how well the questionnaire and a related diet and activity plan for each worker would go over in other cultures, Lacefield said.

And you thought you were fighting year 2000 fires

After a tour of six cities to hold year 2000 field hearings, U.S. Rep. Stephen Horn (R-Calif.) last week said a troubling side of year 2000 testing is how hard it is to tell if workaday systems that contain embedded chips will pass millennial muster. "Representatives from the city of Baton Rouge, La., told us about testing the year 2000 status of equipment to their fire trucks," he said. "To their great relief, the trucks' water pumps are year 2000-compliant. To their dismay, however, it turned out that the mechanisms operating their ladders will not work without year 2000 repairs."

Maybe they can call it 'the NT of CPUs'

Sun Microsystems may be battling Microsoft in court, but the Java maker seems to have picked up some of Redmond's rhetoric. Sun chip executives Masud Jabbar and Anil Gadre last week denied that Sun's forthcoming UltraSPARC-III microprocessor was delayed. Jabbar and Gadre insisted UltraSPARC-III — the third generation of Sun's RISC chip family — was on schedule. However, in late July, a Sun spokesman said the company had pushed back the chip's original summer ship date to "some time before the end of the year." Sun now insists that UltraSPARC-III will definitely be out, well, anyhow, before Windows NT 5.0 ships.

Dirty tricks Down Under

Two weeks ago, Australia's ruling Liberal Party discovered that hackers had kicked off an election campaign by hacking into its Web site. The hackers changed at least 32 items, including titles for government officials (Prime Minister John Howard became "Prime Minister for Pain, Suffering and Inequality"), and added links to sex sites. By last week, it was clear that information on how to hack into the site had come from the opposition Labor Party, which then said the hacking was done by rogue party operatives and wasn't an official party scheme. Instead of a special prosecutor, the Australian Federal Police are investigating.

Tennis, everyone?

IBM dumped its sponsorship of the Olympics, but the company seems to be acing its role in the 1998 U.S. Open. Big Blue is running the Open's official Web site (www.usopen.org), which received 175 million hits in the tournament's first week, compared with 63 million hits total last year, said Jeff Ramminger, segment executive at IBM. Among the technological innovations at this year's tournament is a Java Scoreboard that automatically serves users scoring updates for matches in progress every 20 seconds.

Remember when cryptographers linked tens of thousands of computers across the Internet to crack the government's Data Encryption Standard? Now researchers at the University of California at Berkeley's Search for Extraterrestrial Intelligence (SETI) project will try the same approach. The SETI@home screen saver will use idle PC time to spot potential signs of alien life in radio signals from the Arecibo radio telescope in Puerto Rico, then send the results back home to setiathome.ssl.berkeley.edu. News editor Patricia Keefe hopes intelligent life on the Internet will contact her, too. Send news tips and tidbits to her at patricia.keefe@cw.com or call (508) 820-8183.

cc:MAIL

HOW DO WE LOVE THEE? LET US COUNT THE WAYS.

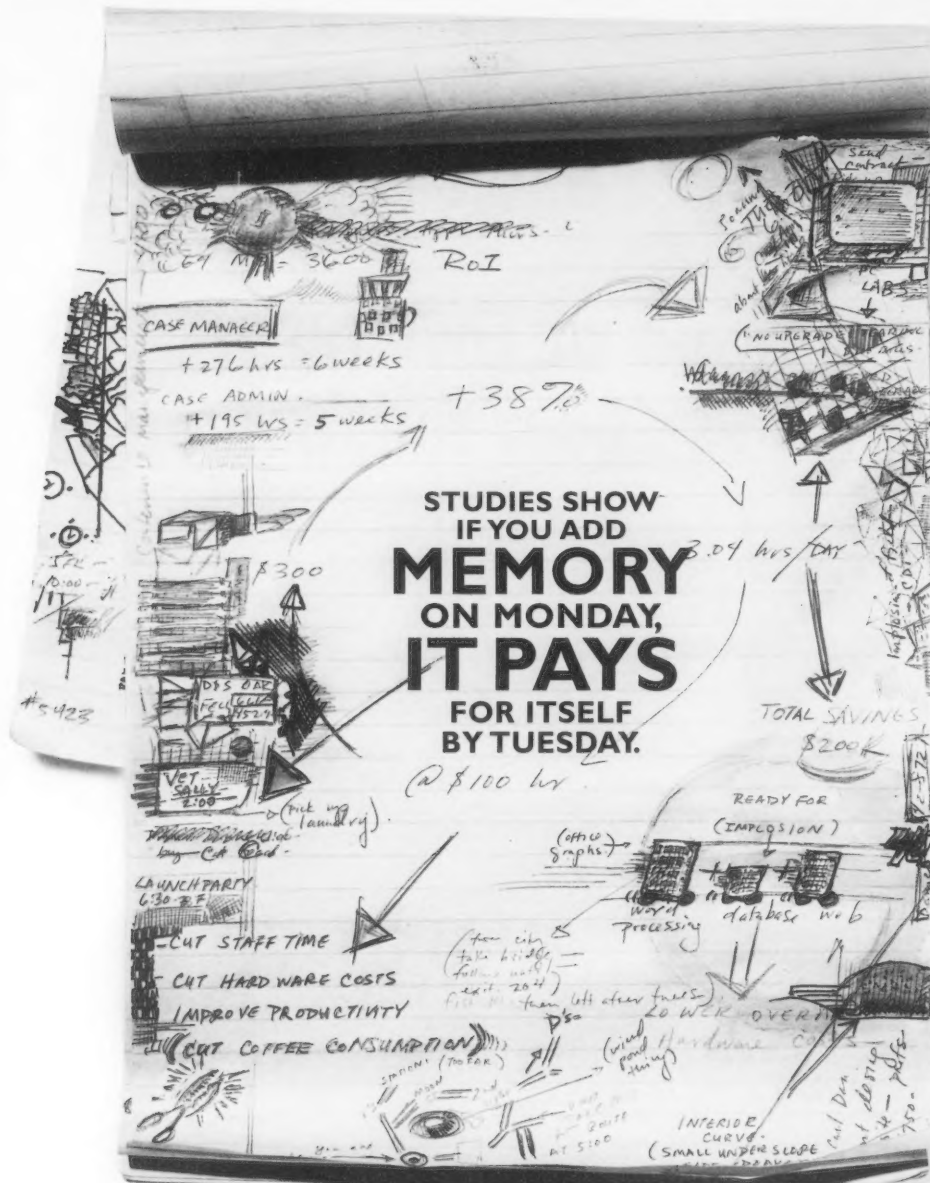
If you're a Lotus cc:Mail® user, which is likely because there are 14 million of you, we need to talk. To be more specific, we need to chat about cc:Mail. There are lots of product enhancements and a new offer you should know about. For \$19* per user, you can upgrade within the Lotus Messaging client family. And, you control how and when you upgrade. One price, three paths to choose from.

- 1) Choose the Lotus cc:Mail release 8.3 Advanced System Pack.
- 2) Choose the new Lotus cc:Mail multi-mode client which works with your cc:Mail post office and the Lotus Domino™ Mail Server.
- 3) Choose Lotus Notes® client for messaging for your Lotus Domino Mail Server.

All you have to do is call our 800 number. We'll give you information about technical seminars that are coming to towns near you, as well as teleseminars and other helpful upgrade tools. Of course, all paths are Year-2000-ready. And just as naturally, we welcome any and all questions. So by all means, call us at **1 800 532-9204, ext. E158**, or visit us at www.lotus.com/migration to learn more. We'd love to hear from you.

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*The Lotus Messaging Software Subscription, formerly referred to as Lotus Passport cc:Mail maintenance, is now only \$19 per user, suggested volume price, for existing cc:Mail customers in 1998. Customers currently on Lotus Passport cc:Mail maintenance are automatically enrolled in this program and may renew for \$12 SVP per user in 1998. Final prices to be set by reseller. The Lotus Messaging Software Subscription allows cc:Mail users to upgrade cc:Mail, and/or use Notes client software licensed for messaging only, and/or use the Domino Mailbox Client Access License (CAL), renewable annually. In Canada, call 1 800 GO LOTUS. © 1998 Lotus Development Corporation, an IBM company. All rights reserved. Lotus, Lotus Notes and cc:Mail are registered trademarks and Domino is a trademark of Lotus Development Corp. For details concerning the Year 2000 readiness of Lotus products, see www.lotus.com/year2000



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